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Established 1914

CHEMICAL INDUSTRIES

Vol. 41 Sept. 1937 No. 3

Published monthly and entered as 2d class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, domestic and Canada, $3 a year; foreign, $4.

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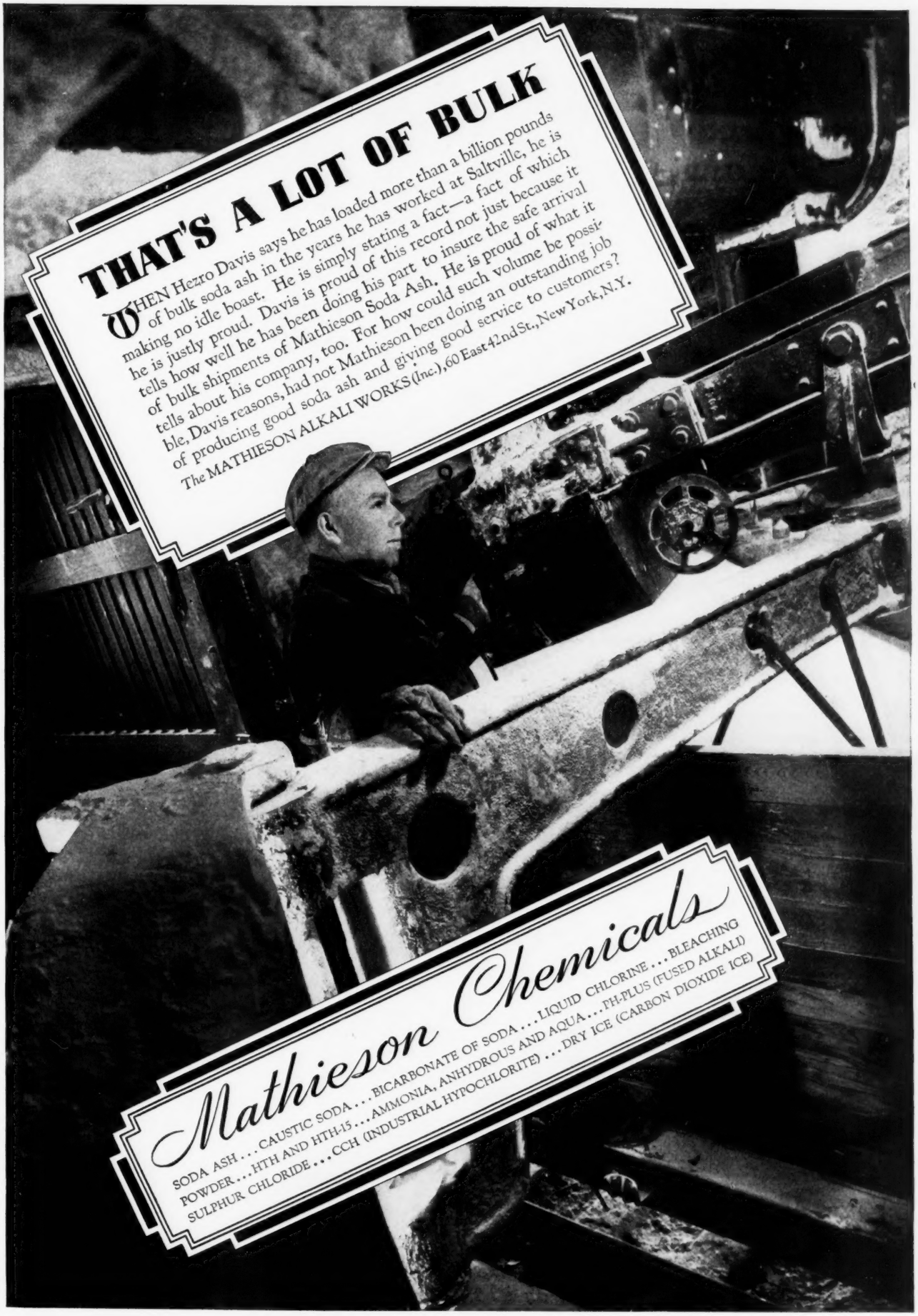
THAT'S A LOT OF BULK
WHEN Hezro Davis says he has loaded more than a billion pounds of bulk soda ash in the years he has worked at Saltville, he is making no idle boast. He is simply stating a fact—a fact of which he is justly proud. Davis is proud of this record not just because it tells how well he has been doing his part to insure the safe arrival of bulk shipments of Mathieson Soda Ash. He is proud of what it tells about his company, too. For how could such volume be possible, Davis reasons, had not Mathieson been doing an outstanding job of producing good soda ash and giving good service to customers?
The MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York, N.Y.
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SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH AND HTH-15 . . . AMMONIA, ANHYDROUS AND AQUA . . . FH-PLUS (FUSED ALKALI) SULPHUR CHLORIDE . . . CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE)

The Reader Writes:—

Not Penny-Wise

We regret that we can't save our money, but we cannot get along without your review. We beg you therefore to renew our subscription regularly.

Barcelona, Spain — Iberica de Industries Quimicas.

Paying the Piper

Most of our mail consists of bills from the tax collectors and most of our reading matter (including your valuable journal) devotes considerable space to outbursts of protests and comparisons with the gay "nineties" when county, city, state and federal debts were still matters of simple arithmetic, although I rather imagine even then dignified, frock-coated, be-whiskered, top-hatted gentlemen forecast, while copiously dipping into the cracker barrel, that repudiation was inevitable.

My New England ancestry plus the more pertinent fact that I am contributing a large proportion of my earnings (not income derived from the efforts of some dead predecessor in the family tree) makes me loathe to part with one cent more than is absolutely necessary. But we must realize that expenditures for public improvements rarely are investments in the usual sense, yet we blithely demand good roads, free colleges, widows and old-age pensions, etc., ad infinitum. Even widowers in New York State are in some cases eligible for a dip into the state "pork-barrel."

Leaving aside Mr. Farley's clubby domain with a shudder of disgust, I hesitate to condemn all other governmental agencies as flesh-pots of downright graft. Would it not be more constructive for industry to make a real comprehensive survey of what is necessary and what is just "fancy-trimming," rather than to "rail" at generalities? An intelligent program is a mighty good offensive in the battle of paring down to normalcy. When, Oh, when will that word become respectable again?

Worcester, Mass. — S. B. Hancock.

Wants 48 Copies

The article by Charles Penrose in your August number calls attention to a factor which is certainly becoming very pressing in many industries; namely, state regulation and state taxes; and I would like to send a reprint of it to all the Governors.

Chicago — Willis Toohey.

What Cost Alcohol?

In your August issue H. Wheeler in "The Reader Writes" asks "how many materials there are from which man has fermented alcohol?" evidently after reading the abstracts of the "Farm Chemurgic" papers.

Practically all vegetable matter contains sugars, starches, cellulose and the like, from which alcohol can be and has been made. Over most of the habitable earth, there are yeast cells which produce alcohol, and sprouting grain will convert starch into sugars as will other processes of decay. But Nature has never made a single drink of alcoholic liquid, for the acetic, lactic, butyric and other bacteria immediately convert the alcohol into acids as acetic. Man learned before the days of Noah that grapes could be made into wine in Mediterranean countries and most races and tribes found something to ferment, as grains in Europe, sugar and sorghum cane and palm sprouts and maguay stems and taro root; whisky, rum, toddy, tequila, and poi. While everywhere there are many fermentable materials; there are few that can be fermented with profit.

Sugar cane molasses is the cheapest material in the U. S. for making industrial alcohol; though in 1904-05 Dr. Wiley in the laboratories at Washington made alcohol from watermelon rinds and all kinds of agricultural wastes. The denaturing law then went into effect and elaborate experiments were made at the St. Louis fair and later at Norfolk on the value of alcohol for internal combustion engines. The law then and now offered facilities for "farm distilleries" but no single farmer was foolish enough to put up such, as is done in Germany.

Black strap molasses from Cuba costs seven and one half cents per gallon and two and one half gallons will make a gallon of absolute alcohol. This gives a material cost of about 19 cents per gallon of alcohol. Corn will give two and one half gallons of 95 per cent. alcohol per bushel and at $1.00 per bushel gives a material cost of 40 cents per gallon.

Regardless of manufacturing costs; it is ridiculous to propose the use of alcohol as a substitute or addition to gasoline. Most European countries, particularly Germany and France, have tried to use it. Germany prescribed it, made from potatoes, till the poor began to starve for lack of their Kartoffel staple food, so that had to be abandoned. France tried it, but signs, at all filling stations, proclaim that "tourism" (alcohol free) gasoline is sold. This was necessary since Americans would not take their cars to France if they had to worry with alcohol gas. The Swiss went on strike some months ago when the Government prescribed large quantities of grape alcohol as a mixture with gasoline and the price went above a dollar a gallon.

The Farm Chemurgic found an "angel" and took over a distillery at Atchison, Kansas, where everything has been experimented with for fermentation. In view of the fermentation costs (as cited above) this threshing old straw is laughable to those familiar with the alcohol industry. On page 139 of your August issue attention is called to the large amounts of ethylene in waste petroleum gases. The cheapest alcohol can be made from them now, but this would not help the farmer.

When the oil is all gone; the shales used up and the coal also; then we will run into the filling station and say "put in a new battery" as the T.V.A. plants will furnish a K. W. H. cheaper than "gas."

New York City — H. O. Chute.

Likes Hoss Sense

You have so doggone much plain hoss sense—I beg your pardon, but I mean you look at things in such a thoroughly realistic way that I wish everybody who has the slightest connection with chemical industry could by some means be compelled to read your editorials and most of your articles. Any man who does not do so is certainly depriving himself of getting the best written expression of the sanest thought on our many current problems.

This letter has been prompted by the vast gulf of difference in your handling of the international conference on the 40 hour week and that of one of your contemporaries. It's all the difference between the practical business view and the impractical technical attitude. This same sensible approach to the N. R. A.—at a time when most people were goose-stepping along with that blue eagle—to taxes, to government in business, etc., etc., has been a very real contribution to clear thinking in these muddled times. To Chemical Industries, *Iron Age* and *The Manufacturers Record* we all owe a very real debt for their sanity and courage.

Baltimore — James T. Heath.

TANNING

MUTUAL BICHROMATES are universally used in the tanning industry. Their uniformity and dependability are a tradition among America's oldest tanners. Ninety years of service to consumers of Bichromates have provided Mutual with a background of knowledge that assures a product to meet the requirements of this most exacting industry.

The illustration shows chrome tanning in drums at the plant of The Ohio Leather Company at Girard, Ohio.

BICHROMATE OF SODA
BICHROMATE OF POTASH

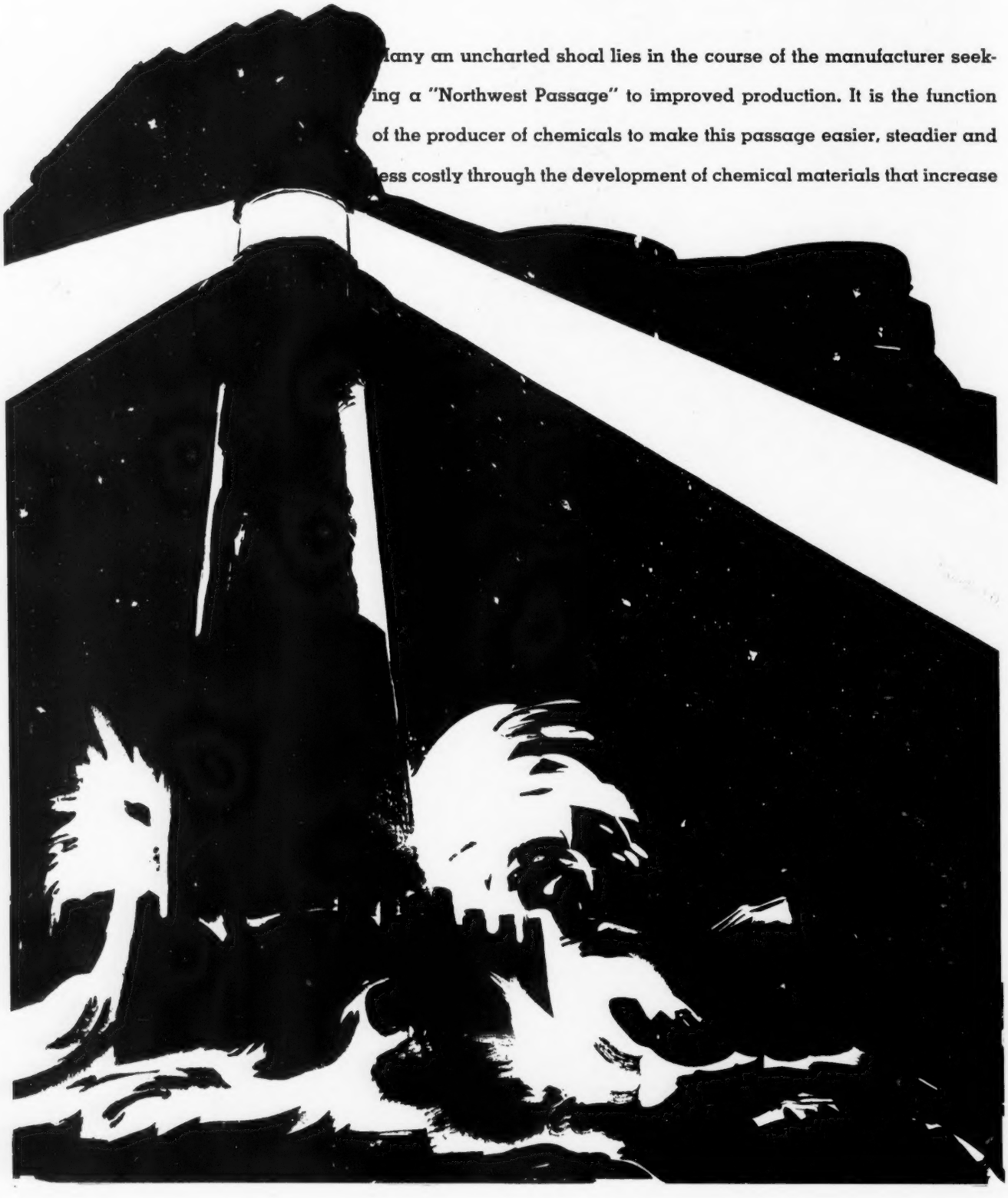
CHROMIC ACID
OXALIC ACID

MUTUAL CHEMICAL COMPANY

Mutual Chemical Company of America - - - 270 Madison Avenue - - - New York City

STEADIER GOING

...IN THE LIGHT OF CHEMICAL TECHNIQUES



Many an uncharted shoal lies in the course of the manufacturer seeking a "Northwest Passage" to improved production. It is the function of the producer of chemicals to make this passage easier, steadier and less costly through the development of chemical materials that increase

ALL ALONG THE LINE

process efficiency and improve product quality.

Cyanamid's policy is to study the problems of its customers and to apply its special chemical knowledge to their solution. Sometimes it is a problem in textile processing. Again it is a question of improving oil refining procedure, or paper production. Often our technicians discover that a standard chemical may be used with economical results in an industry where it has never been utilized before. Such discoveries are frequently the result of the carefully planned research campaigns which Cyanamid systematically conducts for the benefit of its customers in a wide variety of fields.

Typical examples of products that have been helpful in specific industries may be found in the column on the right. You also may find [illegible] going in the light of Cyanamid's special knowledge of chemical tech[illegible]

AMERICAN CYANAMID & CHEMICAL CORPORATION

30 ROCKEFELLER PLAZA · NEW YORK, N. Y.

***AERO BRAND RUBBER SULPHUR**
A product carefully prepared for the most exacting specifications of rubber compounders. Air floated and bolted through silk, it is packed in convenient 50-pound paper bags. Fast service is assured by large stocks at our tidewater plant at Warners, N. J., and our distributors' stocks at Trenton, N. J., Akron, Ohio, and Waterbury, Conn.

****REZYL 387** is an oxidizing type alkyd resin which imparts to nitrocellulose lacquers distinct improvement in such characteristics as adhesion, toughness, color retention and outdoor durability. For such use it is supplied as Rezyl 387-4 (60% solution in toluol).

Our technical staff will gladly supply suggestions on these and other resins to meet individual requirements.

WARP SIZE Concentrated sizing assistants, recommended for use in all cotton warp sizing operations. Their base is pure tallow scientifically blended with other essential elements to form a product having softening powers of high intensity. They mix perfectly with the size, and produce a smooth and highly flexible elastic warp. Their use eliminates flaking on the dry cans, and the warps open freely at the lease rods. Contain no chemicals injurious to cloth. They are removed easily from the cloth during Kier boiling and, in fact, assist in cleaning the cloth. A wide variety of products is offered to meet the individual needs of all weaving mills.

Our standard products are:

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Warp Size W	Warp Size 679
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AEROSOL WETTING AGENTS —Aerosol OT—the most powerful wetting agent on the market. Stable under acid, neutral and slightly alkaline conditions. Aerosol OT (unlike the usual wetting agents) is available as a pure material and appears as a wax-like solid, soluble in all organic solvents and in animal, vegetable and mineral oils. Also available in dilute form as an aqueous dispersion or as a clear solution; and in powdered form, combined with an inert organic medium. Used in oil well drilling, lubricants, shoe polishes, paper towels, latex emulsions, printing inks, wall paper, removers, pigment grinding, shampoos, hand cleansers, rubber mold lubricants.

YELLOW PRUSSIATE OF SODA is used principally in the manufacture of [illegible] blue pigments, such as Prussian Blue, Chinese Blue and Milori Blue, which are widely used in the manufacture of paint, lacquer, printing ink and related products. Aero Brand Yellow Prussiate of Soda analyzing over 99% Sodium Ferro-cyanide, has been the standard of quality for many years, but recent improvements in equipment now insure even higher quality and uniformity.

Watch this column monthly for the announcement of other interesting Cyanamid developments. Technical information on these and other Cyanamid products is available on request.

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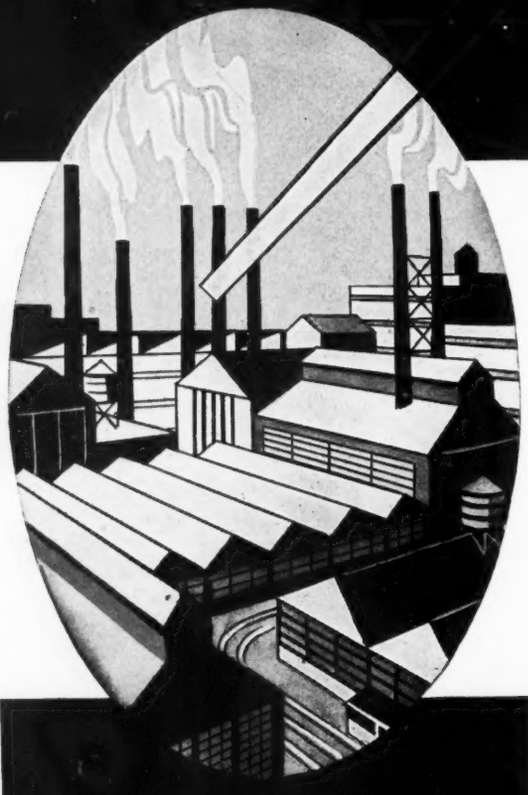

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CHEMICAL INDUSTRIES

The Chemical Business Magazine

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Chemical Industry in 1957

AMID all the grave uncertainties that make future planning so nerve wrecking a task for chemical management, there is one element, now in an admittedly unsatisfactory state, which could be tackled with the sure knowledge that nothing which may happen can change or nullify the results of a wise decision made today. Come hell or high-water, the future of the chemical industry is dependent upon an adequate supply of good chemists and engineers.

The present supply is more than adequate in numbers, but there are serious differences of opinion as to its quality. Even the question of just what constitutes "goodness" in a technical man is hotly debated. How goodness may be achieved by selection and training has long been argued. Since the problem of training can hardly be settled until the question of requirements is answered, we have asked a number of plant and research executives in divergent fields wherein they find that the average recently graduated technician fails in his work for them. Their extremely illuminating replies are printed in this issue.

It is helpful that throughout this consensus of opinion run three different thoughts. If every criticism were different, one would be forced to conclude that each arose from peculiar local conditions or the idiosyncrasies of the employers. Lack of cultural background and deficiencies of character or personality are matters of selection rather than chemical training; but it is important that so many criticize the so-called "practical" course and bewail the lack of fundamental scientific training in chemistry.

These brief articles are very meaty and readable. They contribute a great deal to a better understanding of possibly the only problem to which our chemical industry can hope in these times to discover a solution that will be of permanent value, to our entire personnel, to every company, and to the industry as a whole.

An Executive Responsibility

Sound advice was given to our industry's leaders by one of their own number when he told them at Seaview to know what goes on in their plants and what their men are thinking. A few have taken this suggestion literally and have seen with their own eyes and heard with their own ears.

Better paid than most and working shorter hours, chemical workmen have seldom been tempted by the blandishments of professional organizers. Where dissatisfaction has given the agitator a chance, it usually traces back to some personal grievance so trivial that it is pathetic. Some hard-pressed plant boss, too intent upon cost-output records to weigh human values, refuses time off to a key workman with a sick wife (an actual instance) with the result that ill will supplants loyalty. And the first lesson learned by one of these plant-visiting executives was that operating policy is quite as important a responsibility as is financial policy or sales policy.

A chemical plant is obviously operated for production. Varying yields, alternative raw materials, competing processes, even in our most standardized heavy chemicals, put severe strains upon our operating staffs. All combine unmistakably to focus the attention of the plant manager upon costs in a way not dissimilar to the emphasis on price which is thrust upon the sales manager. Between the grind of maintaining heavier schedules and restraining rising costs, it is hard indeed for him to view production broadly. In the bigger plants the details of operation, maintenance, and replacement must be delegated. Personal contact with the men becomes very difficult. Yet these human relationships and these administrative details demand the real executive touch. They must proceed under a broad policy of success and solidarity for the whole industry. They demand on occasion all the diplomacy and firmness, the vision, and the swiftness that stamps the decisions of a great industrial leader. They are responsibilities that cannot be delegated to process foremen and gang bosses.

What Our Workmen Are Thinking About

A by-product of that executive's personal contact with his workmen was a surprising, new knowledge of what they are thinking these days. Most feel that the C. I. O. is a racket—"two dollars a month for what? no sick benefit, no pension, no strike fund, not even a receipt" was set forth in varying terms by many men. If this belief is widely held in other plants and throughout other industries, Lewis is foredoomed to failure.

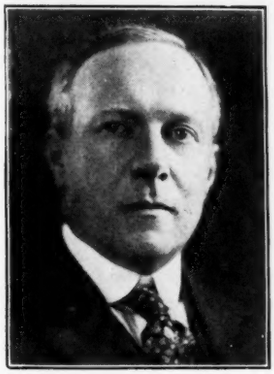
Likewise, the Social Security Tax was usually regarded as a "politician's racket." Hardly a man believed he or his family would even get back any benefit from the money taken from every week's pay envelope. Here was a tax that was felt and so apprehended, while the vague taxes upon the company roused neither resentment nor sympathy. Hardly a man cared a fig for the Constitution, or the Supreme Court, or reciprocity tariffs; and most of them have never heard of the Patman Law. There is little fear of inflation, no concern about the squandering of public funds, but fierce resentment against the bum's rush to get and stay on the relief rolls.

Until a political question becomes a personal problem it is outside the ken of millions of voters. This has often been said and it was again proved last November. It points plainly to the only way the problems of today can be made vital and living and automatically defines the issues of 1942. It would pay the industry in simple, direct language to explain to its workmen how chemicals are used and why, and the individual company might very well set forth to its own people a more detailed story, in language they understand, of their products and the uses of them, of their competition, and of the problems of the other departments of the business.

Our Guest Editorial

Sir Josiah Stamp, an outstanding figure in British economic and financial life, writes for *The Rotarian* magazine on "The Scientist and Society" as follows:

> At the British Association meeting at Blackpool, the president of the Chemistry Section said the scientific workers were becoming increasingly restless and they were impatient at the extent to which their knowledge was made to serve inhuman ends. Scientists were, of course, patriotic, and had put themselves freely at the disposal of the State in time of need. He thought, in the famous phrase, that "patriotism was not enough" and the considerations of humanity were even greater. "Whatever be our individual attitude in this matter, it is time for chemists and scientists in general to throw their weight into the scale against the tendencies now dragging science and civilization down and debasing our heritage of intellectual and spiritual values."
>
> In the calm atmosphere of a scientific meeting, these words were received with significant applause.
>
> The scientists themselves are beginning to claim either that the politicians are so ignorant of science that they frustrate it, or else that the trained scientific mind would do the politician's job better than the politician himself. The scientist takes the attitude, as a rule, that it is society's job to accommodate itself to the novelties introduced by the scientist, and he cannot be expected to be responsible.



The Sons of Aniline

A record of useful accomplishments by this important chemical family

By Dr. August Merz

Vice-President, Calco Chemical Company

ANILINE is the ancestor of a large and lusty family which has played an important rôle in our industrial development. Because of its great reactivity, its descendants are numerous and diverse.

In 1826, Unverdorben obtained an oil by distilling indigo. As this oil formed well defined crystalline compounds with certain acids he named it krystallin. In 1834, Runge isolated a liquid from coal tar, which he named cyanol because of the blue color produced by its reaction with chloride of lime. In 1840 Fritszche confirmed the observation of Unverdorben by distilling the product of decomposition of indigo with alkali. He proposed the name aniline to indicate its relation to indigo, which in Spanish was called anil. Presently Erdmann established the identity of krystallin and aniline. In 1842 Zinin subjected nitro benzene to a process of reduction, obtaining an oil which he named benzidam. Fritszche established the identity of aniline benzidam. Hofmann showed cyanol to be identical with krystallin.

Thus it was established that the aniline nucleus is formed in certain vegetable growths, in the distillation of coal; and in a chemical process, the nitration of benzene followed by reduction.

Hofmann undertook a systematic study of aniline and its derivatives. In spite of Zinin's discovery that aniline could be obtained from benzene, a text-book on chemistry published about 1853 still recommended indigo as the best source of aniline. Not until 1856 when Perkin, in his unsuccessful attempt to synthesize quinine from aniline, accidentally produced a new dyestuff was there a sufficient demand created to warrant the production of aniline from benzene.

The aniline Perkin used in his early experiments, obtained from coal tar, was contaminated with toluidine. Had he used pure aniline his experiments could not have yielded his new dye. Even later when aniline was produced chemically from benzene, it was still contaminated with homologues. The art of fractionating benzene reasonably free from toluene had not been developed on a commercial scale.

Perkin's discovery aroused great interest and soon many chemists were busy seeking new dyes. They subjected aniline and its derivatives to various reactions and in due course found a range of colors from yellow to black. So many dyes had their origin in aniline that even today the dyes derived from coal tar are still popularly called "aniline dyes," though many are not related to aniline.

At first, little attention was paid to the scientific aspect of investigation. Gradually systematic studies of dye chemistry were undertaken. An understanding of the mechanics of the reactions leading to dyes stimulated further studies and chemists became more intelligent in their search for new colors. By correlating the results of earlier trials the chemist was able to predict, with some degree of certainty, what might be expected from further experiments.

Even before man covered his nakedness, he decorated his body with colors. When clothing became the vogue his love of color impelled him to seek means of coloring his raiment. We have only to read, "Now Israel loved Joseph more than all his children because he was the son of his old age, and he made him a coat of many colors," to realize that such garment was a mark of distinction, to be highly prized. The early Egyptian tombs have revealed mummy wrappings dyed in many colors, including cloth well dyed with indigo. Thus, we trace the use of dyes back at least six thousand years.

Yet, till Perkin's discovery all dyes were natural products obtained direct from Nature by means of primitive processes of grinding, extraction, fermentation, roasting, or the like. Their production and application were arts handed down from father to son.

The noble Roman was distinguished by his royal purple toga. The dye for this purple was obtained from a small mollusk abounding in the waters about Tyre, hence the name Tyrian purple. Twelve hundred of these small mollusks yielded about fifteen grains of dyestuff. No wonder that a pound of royal purple cloth cost the equivalent of about $170. And Pliny comments that while pearls are an everlasting possession passing from man to man like landed estates, the colors extracted from the murex and the purpura, which fade from hour to hour, are a luxury making them as valuable even as pearls.

Perkin's mauve flung wide a new door in the use of color. In rapid succession there appeared dyes of undreamed variety of color and brilliance. Their lack of fastness was compensated by an ease of application till then unknown and they found immediate favor. Further research resulted in dyes of greater and greater permanence; dyes of special properties such as dyeing cotton without the need of mordants; dyes which showed selective affinity for different fibers; dyes which appeared the same under sunlight and under artificial light; dyes which were resistant to soap, to laundering, to ironing. Such products revolutionized the textile industry.

With cheaper dyeing, brightly colored clothing and draperies were no longer restricted to the wealthy. Many who could now afford additional suits of clothing had no desire for more homespun. But when a variety of colors came within their reach, their esthetic sense spurred them to expand their wardrobes. More suits, more cloth; more cloth, more textile work; and so we can trace a very definite expansion and advance in the textile industry to the introduction of synthetic dyes. Prior to Perkin's discovery, there were available at most—two dozen dyes from natural sources. The coal tar dye industry has developed more than fifteen hundred dyes which have been commercially used. And with few exceptions these are not duplications of natural products; they are man's creations.

The relation of aniline to indigo, as disclosed in its original discovery, roused many chemists to efforts to produce indigo from aniline. Adolf von Baeyer succeeded in synthesizing indigo, but not from aniline. His process was a scientific triumph, but so costly that no commercial success could be hoped for it. Later Heumann succeeded in obtaining indigo from aniline, but the yields were so small that his process could not compete with the natural product.

The necessity for a plentiful, inexpensive starting material was obvious because natural indigo was consumed in enormous quantities and it was not very costly. Von Baeyer's synthesis failed commercially because of the scarcity and cost of the necessary starting material. The cost might have been overcome but the scarcity never. Heumann's synthesis failed because of the small yield of indigo obtained by it. A way round the difficulty was found in a process which starting from naphthalene produced a close relative to aniline and yielded sufficient indigo for commercial success. Soon after a modification perfected the Heumann synthesis so that it was a worthy competitor. The dream of the chemist to produce indigo from aniline was realized.

Pharmaceutical research led to derivatives of aniline effective in alleviating human ills. One of the earliest was acetanilide, the product of condensation of acetic acid and aniline. The discovery in 1886 that acetanilide exerted definite antipyretic effects was made through an error in substituting it for naphthalene. After fifty years it is still extensively used as an antipyretic and analgesic. In 1935 almost 500,000 pounds of acetanilide were produced in the United States for medicinal use. Other antipyretics such as phenacetin and antipyrene and other pyrazolones are close relatives to, or descendants of aniline. Also cinchophen, that boon to those sufferers from gout or arthritis, is closely related to aniline.

Sulfanilic acid, obtained by the sulfonation of aniline has found a variety of uses as a reagent in the study of biological processes. The astringent and analgesic action of sulfanilic acid make it useful in treatment of catarrh and similar afflictions. A recent development is the discovery that sulfanilamide, a direct descendant of sulfanilic acid, is effective in combating the dreaded hemolytic streptoccal infections, erysipelas, etc.

Aniline and its descendants have played a very important part in the rubber industry. Aniline itself was found to accelerate the curing of rubber and later some derivatives such as mercapto benzo thiazol, diphenylamine, phenyl-beta-naphthylamine, diphenyl guanidine, phenyl hydrazine thiocarbanilides and others were found to be superior to aniline in this respect. Other derivatives have an anti-oxidant action in rubber. These corrective chemicals produce tires of greater durability more rapidly, thus reducing initial cost and increasing mileage use. The improvement in tire manufacture has lengthened the life of a tire six to eight fold, and much of this may be credited to the use of the modern rubber chemicals in the making of which aniline and its derivatives have been such an important factor. The horseless carriage awaited the development of the pneumatic tire to become practical. It may be a coincidence, but it is nevertheless the fact, that the introduction of the use of rubber chemicals derived from aniline marked the beginning of the enormous expansion in the use of automobiles.

Aniline has to some extent entered into synthetic resins. Though as yet it has not and possibly may never make great inroads on the alkyd resins, yet resins made from aniline have their specialized uses and who dare say that their use will not sometime revolutionize the synthetic resin industry?

Diphenylamine, a direct descendant of aniline, has for a long time been used as a stabilizer for smokeless powder. Comparatively recently a sulfur derivative of diphenylamine called thiodiphenylamine has been used with considerable success as an insecticide in checking certain plant pests. Hydroquinone, produced directly from aniline, is a photographic developer—one of the constituents of the generally used M. Q. Developer. The motion picture industry is the largest consumer of hydroquinone since practically all such films are developed by a formula containing it. Hydroquinone is also a preservative for products which suffer deterioration by oxidation on storage. Oils and similar materials which become rancid on ageing are made more stable by the addition of small amounts of hydroquinone.

Aniline also finds use as an adjunct chemical in certain processes of oxidation by protecting the desired products from over-oxidation. An example of such use

Table of the Uses of All Important Aniline Derivatives

	Intermediates	Adjunct Chemicals	Dyes	Pharmaceuticals	Insecticides	Flotation Agents	Rubber Chemicals	Anti-Oxidants	Explosives	Stabilizers	Photographic Developers	Resins
Aniline	x	x	x	x	x	x	x	x	x	x	x	x
Aniline Salt	x	..	x	..	..	..	..	..	..	..	..	..
Diazobenzene	x	..	x	x	..	..	..	..	..	..	..	..
Phenylhydrazine	x	..	x	x	..	..	x	..	..	..	..	..
Antipyrene	..	..	..	x	..	..	..	..	..	..	..	..
Phenylmethylpyrazolone	x	..	x	..	..	..	..	..	..	..	..	..
Sulfanilic Acid	x	x	x	x	..	..	..	..	..	..	..	..
Diazobenzenesulfonic Acid	x	..	x	..	..	..	..	..	..	..	..	..
Phenylhydrazine Sulfonic Acid	x	..	x	..	..	..	..	..	..	..	..	..
Sulfanilamide	..	..	..	x	..	..	..	..	..	..	..	..
Acetanilid	x	x	x	x	..	..	..	..	..	..	x	..
p-Nitracetanilid	x	..	x	..	..	..	..	..	..	..	x	..
p-Nitraniline	x	..	x	..	..	..	..	..	..	..	x	..
p-Phenylenediamine	x	..	x	..	..	..	..	..	..	..	x	..
Anhydroformaldehyde Aniline	x	..	x	..	..	..	x	..	..	..	..	x
Methylaniline	x	..	x	..	..	..	..	..	..	..	..	..
Ethylaniline	x	..	x	..	..	..	..	..	..	..	..	..
Ethylbenzylaniline	x	..	x	..	..	..	..	..	..	..	..	..
Ethylbenzylaniline sulfo acid	x	..	x	..	..	..	..	..	..	..	..	..
Diethylaniline	x	..	x	..	..	..	..	..	..	..	..	..
Diethylanilin sulfo acid	x	..	..	..	..	..	..	..	..	..	..	..
Diethylaminophenol	x	..	x	..	..	..	..	..	..	..	..	..
Tetraethyldiaminodiphenylmethane	x	..	x	..	..	..	..	..	..	..	..	..
Dimethylaniline	x	..	x	x	..	..	..	..	x	..	..	..
Dimethylanilinsulfoacid	x	..	x	..	..	..	..	..	..	..	..	..
Dimethylaminophenol	x	..	x	..	..	..	..	..	..	..	..	..
Tetramethyldiaminodiphenylmethane	x	..	x	..	..	..	..	..	..	..	..	..
Michler's Hydrol	x	..	x	..	..	..	..	..	..	..	..	..
Nitrosodimethylaniline	x	x	x	..	..	..	x	..	..	..	..	..
p-Aminodimethylaniline	x	..	x	..	..	..	..	..	..	..	..	..
Tetryl	..	..	..	..	..	..	..	..	x	..	..	..
Diphenylamine	x	..	x	..	x	..	..	..	x	x	..	..
Thiodiphenylamine	..	..	..	..	x	..	..	..	..	..	..	..
Phenylglycine	x	..	x	..	..	..	..	..	..	..	..	..
Phenylthioglycolcarboxylic acid	x	..	x	..	..	..	..	..	..	..	..	..
Acetoacetanilid	x	..	x	..	..	..	..	..	..	..	..	..
Naphthol AS	x	..	x	..	..	..	..	..	..	..	..	..
Quinoline	x	..	x	x	..	..	..	..	..	..	..	..
Cinchophen	..	..	..	x	..	..	..	..	..	..	..	..
Oxyquinoline	..	..	..	x	..	..	..	..	..	..	..	..
Arsphenamine	..	..	..	x	..	..	..	..	..	..	..	..
Phenyl-alphanaphthylamine	x	..	x	..	..	..	x	..	..	..	..	..
Phenyl-betanaphthylamine	x	..	x	..	..	..	x	..	..	..	..	..
Phenyl-periacid	x	..	x	..	..	..	..	..	..	..	..	..
Diphenylguanidine	..	..	..	..	..	..	x	..	..	..	..	..
Mercaptobenzothiazol	..	..	..	..	..	..	x	..	..	..	..	..
Thiocarbanilid	x	..	..	..	..	x	x	..	..	..	..	..
Hydroquinone	x	..	x	..	..	..	..	x	..	..	x	..

is the manufacture of vanillin. Aniline is an antiknock agent for motor fuels, but its use has not become general because other materials produce similar effects at less cost.

The varied uses of aniline in industry have become so extended that in 1936 there were produced in the United States more than 30 million pounds. This tonnage found its way into dyes, rubber chemicals, pharmaceuticals, photographic developers, resins, and all manner of technical products.

Thirty years elapsed from the time of its discovery by Unverdorben before Perkin pointed the way for its commercial use. Since then others by their contributions to our knowledge concerning its usefulness have again and again developed new outlets for it or its derivatives. By these increased applications other industries have expanded to unexpected proportions. Increased aniline production required more acids and other chemicals. Thus the entire chemical industry benefited. The development has gone far beyond the wildest possible flights of the imagination of the early investigators. Today you and I can visualize the facts of the eight decades since the time of Perkin. That requires no imagination. But what of the future development? That does require vision and imagination, for surely the end is not yet.

American Industry and

'Munitions makers' embrace all industry because a military force requires practically all the implements of peace for uses of war —some would have us believe that modern munitions, including armaments, are a cause of war. They are in error—their hatred of war blinds them to its causes. When we condemn the profiteer, let us not be so naïve that we eliminate the wheat grower and the cotton planter when the price of wheat increased 149% and cotton 125% during the World War and yet forget that the cost of cannon powder was reduced 5.7% and of small arms powder, 20%. The Industrial Mobilization Plan authorized by the National Defense Act of 1920 is practical, sane, and realistic. It is not based on muddle-headed thinking. Least of all does it implicate that a major war might be used as a priceless opportunity to adopt extremist ideas foreign to our American spirit.

WHAT industry produces for the national defense whether in peace or in war and whether produced in privately-owned or Government-owned plants, all those things produced for the national defense are known as *"munitions"*—a term which in the hands of the demagog, the agitator and the emotionalist has been and is misinterpreted, misunderstood and misapplied.

A great many of our people misconstrue the terms "munitions" and "ammunition." These terms are not synonymous, "ammunition" being a very small but important category of "munitions." In the strict or military sense the term "munitions" includes everything a military effort requires—from field guns and shoulder rifles to shoes and socks, from tanks to toothbrushes, from army mules to navy beans. Therefore "munitions makers" is a term which embraces all industry because a military force requires practically all the implements of peace for uses of war.

Certain fallacies of fact and of reasoning are prominent in the armament agitation of the day. Some well-meaning people would have us believe that modern munitions including armaments are a prime cause of war. They are in error—their hatred of war blinds them as to its causes. Armaments are an *effect* and not a *cause*. Wars existed centuries before modern armaments were dreamed of. Lord Raglan, discussing this fallacious contention, put it that "to say that armaments cause war is the equivalent to saying that a man plays golf because he has a niblick."

Some well-meaning people would have us believe that modern munitions including armaments prolong wars. They are in error—again because emotion replaces intellect. History records the Revolutionary Napoleonic wars which lasted twenty years. History also records the Thirty Years' War and the Hundred Years' War. Yet modern armaments were undreamed of during these conflicts.

Finally, some well-meaning people would have us believe that if armaments disappeared wars would cease. They too are in error. Munitions, including weapons, do not have wills of their own. They do not go about the world attacking one another or seeking whom they may devour. They are only weapons in the hands of man. Without the will to use them and barring accident they are as harmless as a clod of earth. They are mere curiosities unless the will of man determines to use them. And the will of man has been referred to as a decidedly more unstable compound than TNT.

Some day more effective efforts to outlaw war will turn from weapons, which have little to do with the issues of war and peace, to the one and only direction of realistic and effective value; namely, the development of moral principles of justice and right which have everything to do with the issue of war and peace. In my humble judgment this will come about when and only when mankind has a common moral basis of conduct. Its media and bases will be not education or intellectual training alone but moral training and moral conduct founded on practical definite religion.

The rôle of industry in modern warfare was tragically brought home to the American people in 1917 and 1918. With intense warfare waging on the continent of Europe, we witnessed the peaceful efforts of a God-fearing, sincere and eminently capable Chief Executive whose principal appeal to the electorate was made on his success in maintaining the accepted principles of neutrality and thus keeping us out of the world conflict. During the two preceding years some few branches of American industry had undertaken to supply certain of the European belligerents with some of the finished items of military equipment, notably powder, ammunition and small arms, while other branches of our industry were supplying raw materials, manufactured products, food and the necessities of life. So certain were we that we would not be drawn into that conflict that no effort had been made to analyze the ability of American industry generally to produce munitions for our own possible needs until a Council of National Defense was established in 1916.

Many of us remember that the Congress declared a state of war to exist on April 6, 1917. The declaration was based on the violation of the accepted doctrine of freedom of the seas—not that the violation trespassed upon property rights but because of the indiscriminate killing of American citizens. This has recently been restated with admirable simplicity and truth by our World War Secretary of War, Newton D. Baker. It was originally stated by President Wilson when accepting renomination, September, 1916, "Property rights can be vindicated by claims for damages . . . but the fundamental rights of humanity cannot be." What our effort in the war was to be did not crystallize for

Our National Defense

Major L. A. Codd, the author, is Editor of "Army Ordnance" and with first hand knowledge of the sinews of war combines a working knowledge of industry and a deep interest in military and economic history. He is a strong advocate of Peace and a stout supporter of Preparedness: nor are the two incompatible. This article is an abstract, made with his permission, from the address that he delivered at Princeton University under the 1937 Brackett Lectureship in Applied Engineering and Technology. Under this famous foundation a number of men well known to chemical industry have been called to speak and among the past Brackett Lecturers are F. M. Becket, James H. Critchett, John V. N. Dorr, Williams Haynes and William Vermilye. Though, as he carefully distinguishes, chemicals and munitions are not synonymous, nevertheless this industry is notably concerned with national defense.

some months. At first it was thought that our help would be entirely financial. This evolved into a promise to furnish raw materials and some finished products; finally it was agreed that we would mobilize an army of millions to take its place beside our Allies on the Western Front.

The few men in the United States who understood the problem and the consequent delays and costs could not have been optimistic as to the results to be obtained. Being practical and capable individuals, they knew the inherent difficulties of this colossal undertaking. They knew that there would be mistakes and delays aplenty. In the official report of the operations of the A.E.F., General Pershing writes, "We sought assistance in obtaining the guns needed *at least for the first two years*. It was most fortunate that we were able to get these guns from the French as up to the end of the war no guns manufactured at home for our army of the types used, except 24-8-inch mortars and 6-14-inch naval guns, were fired in battle." Which is to say that our industrial effort at the start—despite its ingenuity, its high purpose, its flexibility and its determination—required almost two years to meet the military demands.

The task staggers the imagination. The scope was as broad as American industry itself. In the field of military ordnance alone 200,000 separate ordnance components were required in quantity; some individual articles required literally hundreds of accurately produced metal parts—our seacoast gun on railway mount alone contains some 6,000 separate pieces. So simple a thing as our Springfield shoulder rifle has 93 parts, 662 manufacturing operations, 1,263 gauging operations. Within a year there were some 5,000 plants in the United States feverishly at work on direct ordnance contracts, 8,000 in all on direct and indirect ordnance contracts and 15,000 contractors at work on all other military supplies. What was done in this effort is a lasting tribute to the ingenuity and patriotism of the men who compose American industry.

Government made mistakes and so also did private industry. Government had no conception of mobilization plans. Private industry had no conception of Government requirements. Putting the two together one can understand the confusion and delay which resulted. But no one can truthfully challenge the intention because it was good.

There is among us today a group of propagandists who paint this picture in an entirely different light. It might be well to devote a moment or two to their misrepresentation. We are told that those portions of American industry engaged in the production of arms were *the* profiteers of war. The charge is a calumny made out of whole cloth. There were some unreasonable profits to be sure, but they were not confined to the producers of armament. Indeed it is safe to say that most of the industrial organizations which turned to the production of military armament eventually did so at a loss and not at a profit. The truth is that some items of ordnance were the only classes of materials during the World War of which the price was reduced.

Let us condemn the profiteer, but let us be gentlemanly enough to condemn *all* profiteers and not one small class. Let us not be so naïve that we eliminate the wheat grower when the price of wheat increased 149 per cent. during the World War, nor the cotton planter when the cost of cotton increased 125 per cent., nor the iron and steel producer when the price of a composite ton of steel increased 151 per cent., nor the producers of all commodities when the average price increased 91 per cent. Likewise those of us whose memories are not so short-lived recall the resultant rises in the costs of labor and of housing and of food. There are millions of "forgotten men" when we speak today of war profiteers. And be it said in gentlemanly fairness that due to the ingenuity of our largest private producer of gunpowder that the cost of cannon powders was reduced 5.7 per cent. during the World War and the cost of small arms powder was reduced 20 per cent.

At this point also may I call attention to the perfidy in the charge that manufacturers of armament were an influence, along with the bankers, in drawing the United States into the World War. The charge is absurd. If it were true it would indicate that the arms makers in their zeal for profits had not the vision of a schoolboy because they must have known—a schoolboy would have known it—that when the United States entered the war, taxes on profits would become almost confiscatory, as taxes eventually did become when our war profits taxes increased to approximately 80 per cent.

All this was our experience of a major modern war. What have we done about it and what do we intend to do about it?

Certainly our most sincere intention to outlaw war is a factual thing in a war-torn world. Neither men nor nations have been reborn in a new spirit. Strive though we may for the visionary ideal, the practical ideal is still the only safe norm of individual and national conduct. Based on this philosophy I believe more than on any other, those American citizens who were charged with the responsibility of mobilizing the industrial effort of the United States during the World War left a heritage to our military and naval power the value of which is beyond reckoning. I refer to the National Defense Act of 1920 which is today the law of the land and which, among its major provisions, outlines a simple and effective means for the utilization of American industrial effort in any future conflict. The Act, in the absence of actual war-time agencies, places upon one branch of Government the responsibility for industrial mobilization planning. Section 5-A of the Act charges the Assistant Secretary of War with the duty of supervising "the procurement of all military supplies and other business of the War Department pertaining thereto and *the assurance of adequate provision for the mobilization of matériel and industrial organizations essential to war-time needs.*"

For the past eighteen years our War Department in cooperation with American industry has been studying ways and means under this mandate for overcoming our mistakes of the World War. Progress has been steady, theory sound, application practical. There are certain fundamentals upon which the philosophy of industrial preparedness is based. The first is that modern war demands the united effort of the entire nation. It will require that capital and labor, agricultural and industry, engineer and artisan, will be utilized according to his or its ability with the least hardship and without undue advantage. The second is that the national effort in time of war is a civilian and not a military function. Although the National Defense Act places upon the War Department the responsibility for planning in time of peace, the execution and control in time of war will become the duty of civilian leadership, leaving to the Army its vital task of bringing about military victory.

A Planned Program

It is unfortunate that this great government endeavor is not better known and more generally understood. There was recently issued, bearing approval of the then Acting Secretary of War and the Secretary of the Navy, the 1936 revision of the Industrial Mobilization Plan. It should be studied by every American citizen who has the slightest interest in our common defense. It is practical, sane and realistic. It is not based upon muddle-headed thinking. It does not attempt to achieve the impossible. Least of all does it anticipate that another major war for the United States will be used as a priceless opportunity for the adoption of extremist ideas foreign to our American spirit.

This plan undertakes to allocate in time of peace the carefully prepared requirements first of the military and naval forces and of the civilian population in all that both classes would require. Further, it provides for control by which priorities will be established, prices restricted and profits kept at a reasonable and fair level. It will revive in time of major emergency a civilian body operating under the war powers of the President and such other enabling legislation as may be required for the coordination of our entire national effort. And it will assure that every element of that effort is utilized to its maximum value, equitably and with the least possible loss of life, time, effort and money. Today our military and naval forces know for any given major emergency what their requirements in commodities and finished equipment will be. These have been tentatively apportioned and assigned to various private industrial facilities throughout the country, and while there will always be details of operation which are unpredictable, still we have progressed an almost unbelievable degree in our knowledge of how to go about the mobilization of our resources for the national defense. Today some 20,000 industrial facilities have been contacted by the War Department so that the advancement over the conditions of twenty years ago is most gratifying.

Bidding Bars the Way

True, most of this is paper work. It will not operate smoothly until we have evolved a method for keeping American industry prepared to produce the complicated weapons of defense. I think it is safe to say that today there is not in the United States a single private producer manufacturing large guns; there are less than a half-dozen of any size producing military small arms so that until peace-time industry has had an opportunity actually to manufacture some of this equipment the possibilities of delay in time of war are great. To overcome this defect, so-called "educational orders" have been proposed several times in recent years, the purpose of these orders being to allow the manufacturer to produce occasionally in time of peace a small quantity of military equipment for our Army so that plant personnel by actual experience are familiar with the engineering and production difficulties involved. Thus far the Congress has refused to authorize educational orders. The difficulty seems to be that no one is willing to face the issue of doing away with competitive bidding for this type of work with the result that, price being the governing factor, scarcely any of our private industries are in a position to take these trial orders. Only the low-cost producer is eligible. It is high time that this penny-wise pound-foolish policy be modified. The ability to produce, which educational orders would assure, is worth a hundred times the peace-time price differential measured in terms of war-time value.

This brings me to a portion of the subject which is also much in the public eye. Along with other schemes for the nationalization of public utilities and natural resources, certain emotional thinkers espouse in this country and in England the nationalization of arms manufacture. By a majority of one, a committee of the United States Senate voted in favor of such a proposal. An "investigation" by this Committee cost the taxpayers of the country more than $190,000. Recently a Royal Commission in Great Britain not interested in sensational newspaper headlines unanimously concluded that nationalization of the arms industry is undesirable. The British inquiry cost the taxpayers of England less than $35,000. Theirs was money well spent; ours—more than five times the sum—was not. Our own military and naval authorities consisting of men of the highest professional standards have opposed nationalization and our War Department officially has done likewise. Those who are enthusiastic for nationalization of the arms industry have been well described by the British Royal Commission, "The desire to abolish the private trade (in munitions) is no doubt in part an expression of the general desire to abolish war. The causes of war are remote and intractable, its implements near and tangible. It is not surprising that many people should project their hatred of war on to the instruments of war in a belief that the control of one will lead to the suppression of the other. But there is much more than this in the policy of those who oppose the private manufacture of arms. It is conceived as an essential part of a great and worthy purpose, the end of which is the construction of world peace. . . . But," the Commission concluded after exhaustive investigation, "the abolition of the private industry in the United Kingdom and the substitution for it of a system of state monopoly may be practicable; but it is undesirable. . . . We believe that the reasons for maintaining the private industry outweigh those for its abolition."

Up to Private Industry

Our own War Department "is convinced that in the event of war American industry must produce the major portion of the required munitions. Assuming this premise, it follows that so far as practicable, industry should be prepared to perform its war mission. . . . The War Department does not favor the nationalization of munitions manufacture—that is, the full manufacture in Government establishments. Such a policy would fail in war, and therefore does not appear logical in peace."

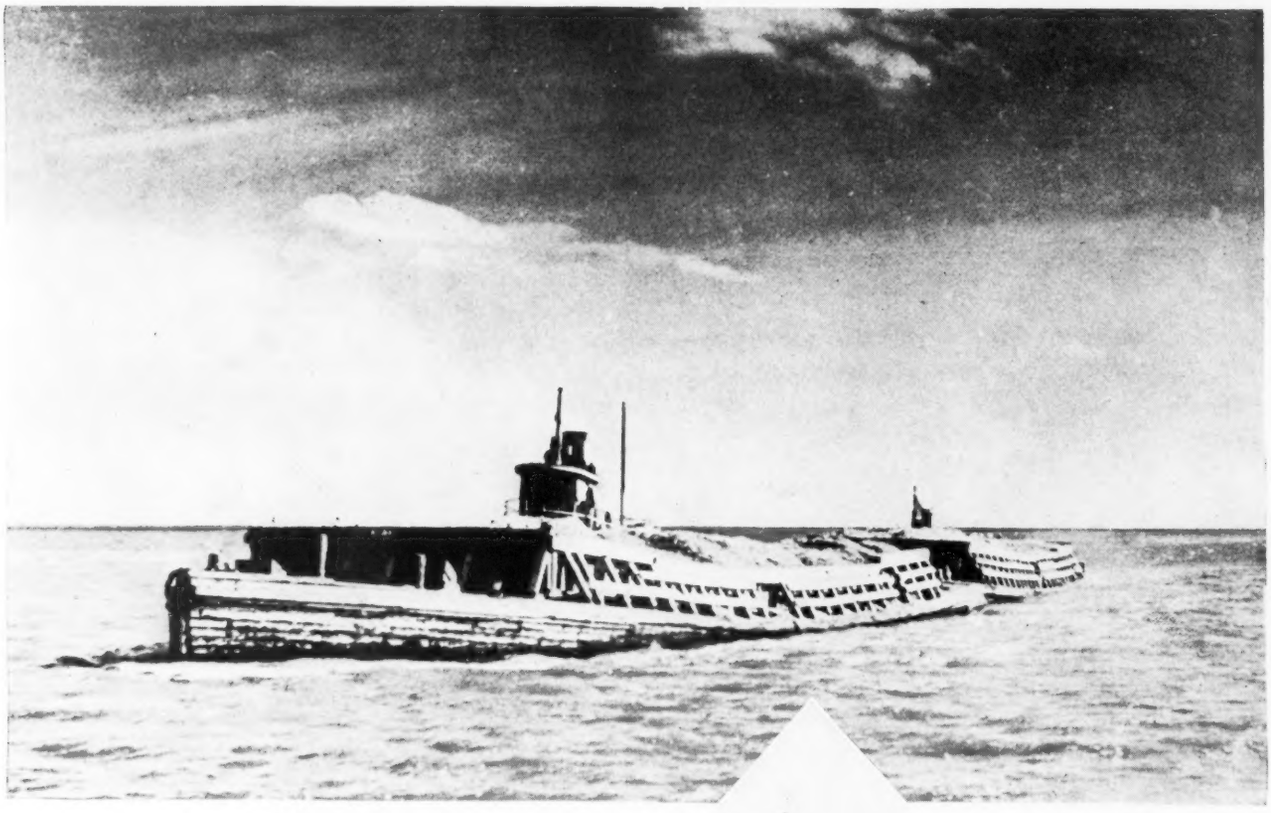
While best professional opinion, including that of our own War Department, opposes any scheme for nationalization of the arms industry, this does not mean that in any future war controls will not be exerted to restrict profits and to attempt maximum industrial effectiveness. Excessive profits should be restricted through appropriate legislation governing the limitation of prices of all commodities and an excess profits tax. Naturally the question of taxation is one of major national concern. It is not a military problem but rather a political and social question. However, any legislation for the control of profit will of its nature apply to *all* commodities without exception and not to any one class of commodities alone. The cotton planter, the wheat grower, the oil producer and indeed the corner grocer must all be subject to the same limitation. But let us hope that any future war in which the security of the United States will be at stake will not be allowed to become a vehicle for changing the time-honored principle of private enterprise for that of the totalitarian state.

Our Charter of Preparedness

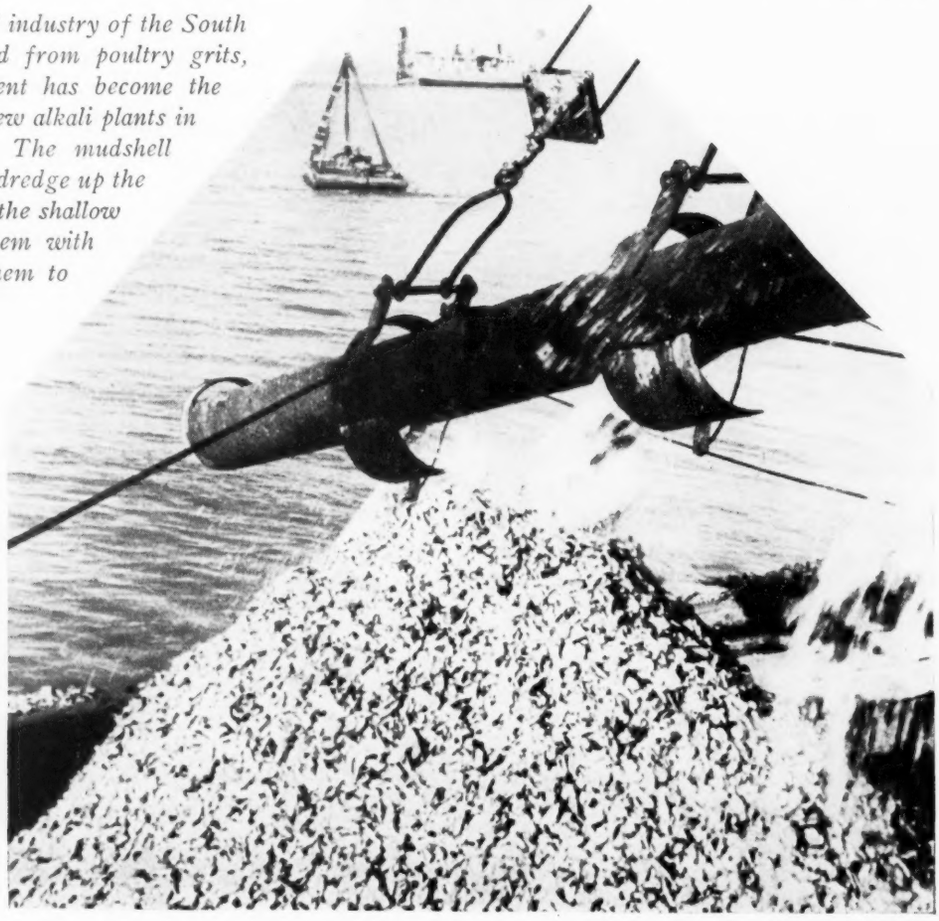
I have given a bare outline of the vast problem of the guarantee that the United States will be adequately armed and munitioned in any major national emergency. The problem itself is as old as the hills yet at no time in our history until now has its peace-time solution been studied and planned for as it is today. This is because we have had the National Defense Act of 1920 as part of the organic law of the land. That act is our charter of preparedness. Its mandate assures us that in time of peace we will have reversed—as we have reversed during the past seventeen years—the traditional lethargy of democracies toward national security. The act is sound; it does not engender a militaristic spirit; it does not demand a huge standing army; it does not warrant great stocks of peace-time armament; it is not costly or extravagant. But it is a charter of national defense such as we had never had before because, above all else, it assures that the tragic lessons of our past will not be forgotten. Its provisions, the studies and plans that are made in accordance with it in time of peace for use in war, are worthy of the interest and cooperation of all our people. In an especial way does it bespeak the interest of our engineers and technicians in private life and in private industry. American industry did a most remarkable piece of work during the World War when it turned from peace-time pursuits to war-time production. In those days its effort was unheralded and unsung, there was no fanfare of trumpets and no dress parade—American industry rolled up its sleeves and worked. Since then its achievement has been forgotten in large part. Its motive has been misrepresented; its record has been derided.

But the one great fact remains that American industry is the greatest peace-time achievement in the entire economic history of the world. Its potential for our national security is equally great. It has shown a commendable desire to cooperate with the national defense of the United States and this in my humble judgment is our strongest guarantee of peace. For I am traditionalist enough to believe in those words of Holy Writ, "When the strong man armed keepeth his court those things which he possesseth are in peace."

Oysters to Alkalies



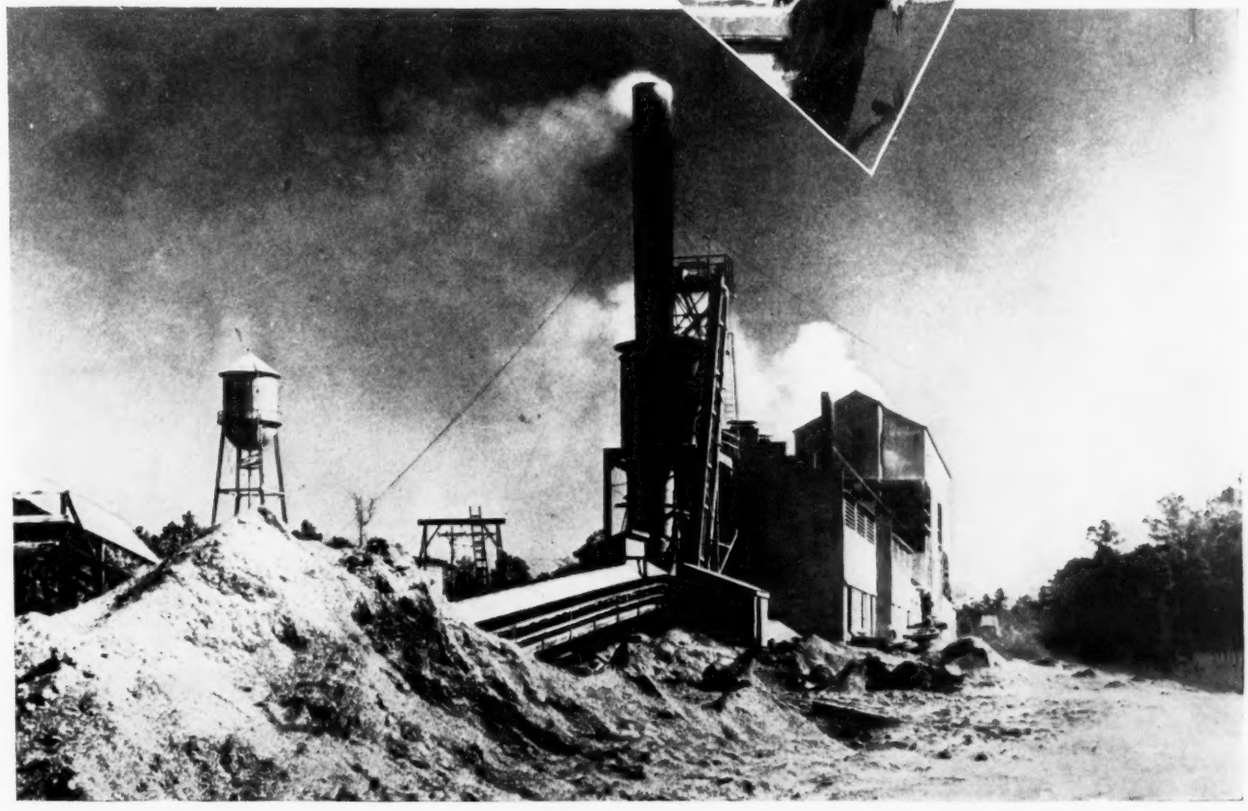
The good old "mudshell" industry of the South has gone chemurgic and from poultry grits, road material, and cement has become the source of lime for the new alkali plants in Louisiana and Texas. The mudshell fleet of scow-like barges dredge up the shells from vast beds in the shallow coastal waters, wash them with sea water, and bring them to the industrial market.



Unloading oyster-shells with a clam-shell bucket and hoist to flat cars that freight them to cities and processing plants. The shells make an ideal road material under Southern conditions, but this ancient use is fast being replaced by the newer industrial demands.

A cement plant working with oyster-shell lime; and facing page 240 is a photograph of the "shell pile" and grinding plant at the Lake Charles operation of Mathieson Alkali.

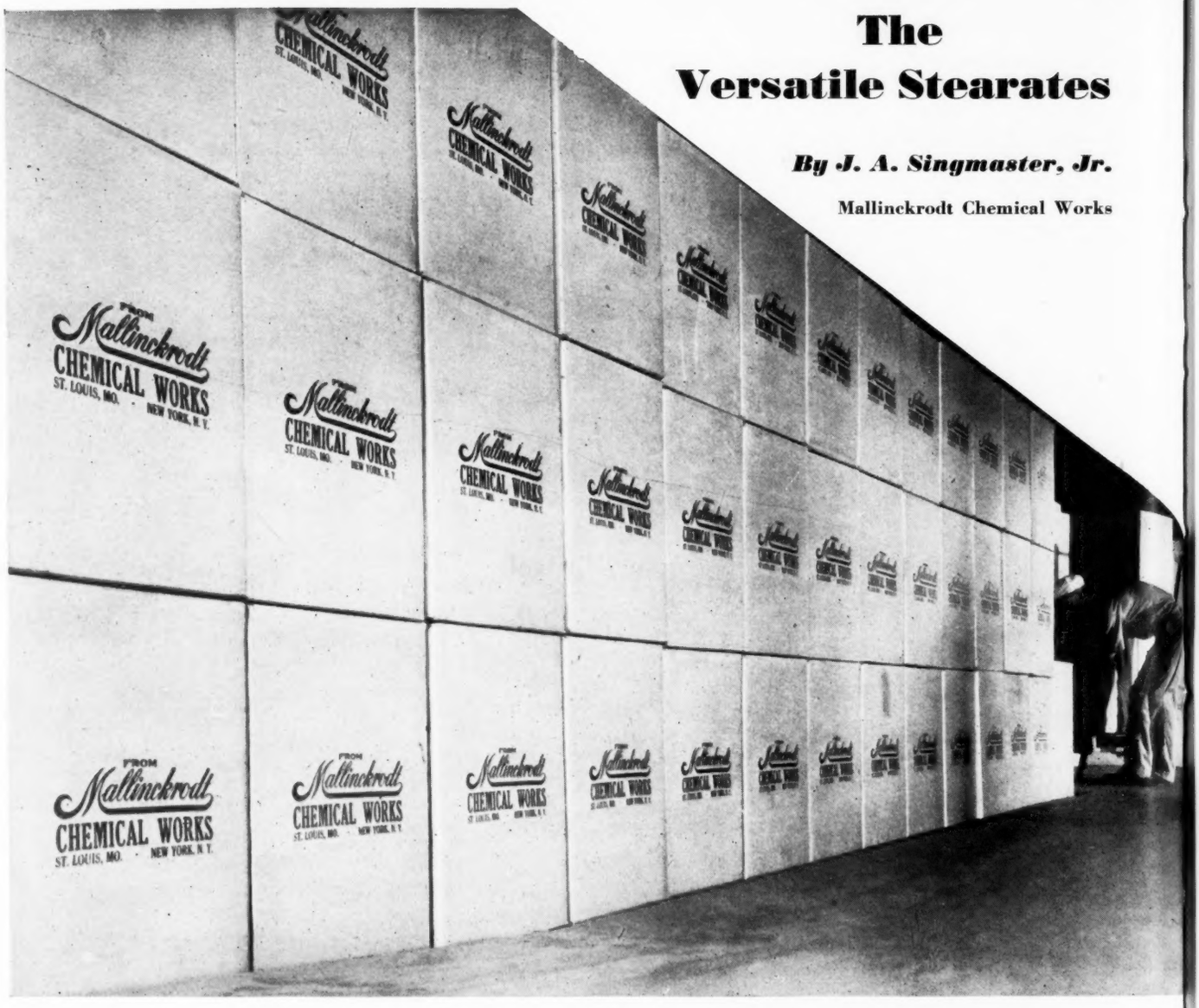
Photos by Galveston Daily News



The Versatile Stearates

By J. A. Singmaster, Jr.

Mallinckrodt Chemical Works



WHEN a new chemical product suddenly rockets into sight, an accurate record is seldom kept of just what started it on its course, who had the inspiration, and whether it was chance or careful planning. So it was with the stearate industry. Many stories are told how these chemicals practically lifted themselves by their own boot-straps to the position of importance they now occupy.

One such story, which has its setting more than fifteen years ago in the Mallinckrodt plant, runs as follows: A salesman learned that the company had been doing research with a chemical known as aluminum stearate, which had unique properties but was used only in small quantities for a few special purposes. At that time twenty or thirty barrels of aluminum stearate was considered a large stock.

The salesman was told that among other things aluminum stearate would cause oils to jell. Knowing of a company which did a large business in lubricants, he dropped in one day and found they were having trouble disposing of a certain oil. He offered a sample of a chemical which, he predicted, could be added to the oil and heated to produce a grease of very interesting properties.

The sample was sent, and nothing more was heard for some time. Then the oil company one day ordered a ton of aluminum stearate. They had made a fine grease of beautiful appearance and immediately found a small market for it. Again there was a long silence, when to the complete consternation of the production department, there came an order for a carload. A carload of aluminum stearate had never been shipped before, and the quantity the railroad stipulated as a minimum carload could not be loaded into the largest freight car available.

Up to that time a carload of aluminum stearate would have represented a high percentage of the total annual production. Now it would be only a fraction of a per cent., for during the past decade the stearates have found many new uses in a wide variety of industries.

This is due to the general chemical progress coupled with the increasing knowledge that these substances have unique chemical and physical properties of value.

Chemists and production engineers have learned that they facilitate many otherwise difficult production processes and are valuable ingredients for many products. And it is not alone in new industries and for new products that they are being increasingly used; many older products have been improved by them.

The term "stearate" includes any metallic salt of stearic acid, and under this heading we should expect to find the stearates of sodium and potassium—the ordinary water-soluble soaps used for washing and cleaning. Actually, however, in the chemical industry the term "stearate" (or sometimes "metallic stearate") is usually reserved for the water-insoluble stearates, such as those of aluminum, calcium, magnesium, and zinc. The stearate of almost any metal can be made; but because of their cost and certain undesirable properties, such unusual stearates as iron, copper, silver stearate, etc., have not as yet any great commercial importance. It is entirely possible that some of these stearates may at any time come into widespread use.

Stearic acid has the theoretical formula $C_{17}H_{35}COOH$. (The stearate radical hereafter will be abbreviated to St.) Although the acid can be refined to practically 100 per cent. purity, this is an expensive process, and in commercial practice stearic acid usually contains a small percentage of chemically similar fatty acids whose nature depends upon the source of supply and methods of production. The properties of commercial stearates depend largely upon the stearic acid used in their manufacture. Very rigid specifications must be drawn to obtain stearic acid that is uniform at all times so that successive batches of stearates will be chemically identical.

Aluminum stearate (at present the most important stearate industrially) presents another fact of great importance both to the manufacturer and to the user. Aluminum being trivalent, so it combines in three different ways with stearic acid to form the mono-acid, di-acid, and tri-acid stearates, having the following formulas respectively: $Al(OH)_2St$, $Al(OH)St_2$, and $AlSt_3$. Recognition of the differing properties of these three substances is extremely important in selecting the proper stearate for a given formula.

From the physical standpoint, all three are nearly alike in bulk, texture, fineness, etc. Chemically their differences may be broadly summarized as follows:

Di-acid stearate is the most important and is used commercially in largest quantities. In many industrial applications an aluminum stearate is used because of its jell-forming properties. Of the three forms, the di-acid gives the maximum jelling per pound.

Mono-acid stearate gives weaker jells, but strangely enough, under certain conditions, the addition of a small quantity of mono-acid to the di-acid form will produce a considerably stiffer jell than obtained with either substance used alone. Such a jell, however, tends to be rather brittle and grainy. As a flatting agent for varnishes, the mono-acid stearate is useful in certain formulas because a comparatively small quantity will give good results. Its behavior will depend upon the exact nature of the formula.

Tri-acid stearate yields weaker jells than the di-acid. The jelling effect produced when this form is used in conjunction with the di-acid form is directly opposite from that produced when mono-acid stearate is used as the modifying agent. The tri-acid stearate cuts down the jell strength, correcting graininess, and giving a smoother material. The tri-acid stearate by itself gives excellent results as a flatting agent.

Stearates are valuable to many industries because of certain unusual physical and chemical properties not found to quite the same degree in other materials. Physically the stearates are smooth, slippery powders. When rubbed between the fingers they form a slick, smooth coating on the skin. Because of this property zinc stearate is a well known dusting powder widely used in the cosmetic industry. This same property makes the stearates useful in the dry state as lubricants for molding and extruding operations, wire drawing, metal stamping, cartridge making, etc., as release agents in the plastic industry, and as anti-sticking agents in the rubber industry.

Because metallic stearates are insoluble in water, they are especially useful in certain types of waterproofing. When small quantities are mixed in the dry form with cement, the pores of the finished concrete become lined with a thin film of the water-repellent stearate which destroys their capillary action and so prevents absorption and transmission of water. For the same reason they are often added to the mortar used for laying bricks. Moisture is prevented from seeping up through the joints and eventually penetrating the bricks to produce an unsightly efflorescence on the exterior.

Calcium and aluminum stearates, incorporated in suitable solvents, make waterproofing liquids that will impregnate many materials, such as textiles, leather, ropes, ceramics, etc.

When aluminum stearate is used, the tri-acid form will probably prove most satisfactory because larger quantities can be dispersed in the solvent. A small quantity of sodium hydroxide in alcoholic solution may be added to the solvent-stearate mixture to permit a higher stearate concentration.

Their insolubility in water also makes the stearates valuable as suspension mediums. One interesting application is the use of a mixture of aluminum stearate with Paris Green for mosquito control. The Paris Green is held longer on the surface of the water, so that there is definite economy in spite of the slightly higher original cost of the mixture.

The ability of aluminum stearate to form jells with mineral oils and various solvents may prove troublesome in certain procedures, while in other cases it may be the foundation for an entire industry. Clear, transparent greases no darker than the original oil can be manufactured with aluminum stearate. Since the soap

in these greases is insoluble in water, they are more stable under wet operating conditions than the soda-base greases which are quickly decomposed by contact with water. Calcium stearate greases are also stable in the presence of water. In the paint and varnish industries stearates are used as suspension mediums to prevent the settling of heavy pigments in ready-mixed coverings. They are also used to impart water-resistance to paints and varnishes and in the manufacture of special waterproofing preparations. Finally, the most complicated use of stearates in these industries is as a flatting agent. A good flatting agent must fulfill the following requirements:

1. Good flatting effect with an economical amount of the agent used.
2. Very little jelling tendency. Too much jelling causes the varnish to set to a buttery consistency in the package.
3. The varnish films must be tough and free from crystalline material.

Because of wide variations in the nature of oils and in the methods of incorporation, it is impossible to say that any one stearate, or one procedure, or a certain proportion of stearate, will always give a satisfactory flat varnish. In one formula results may be perfect, while in another the same procedure may prove entirely unsatisfactory. In addition to stearates, certain finely ground, inert materials are used as flatting agents, but the effect obtained is quite different from that obtained with stearates, and in addition they may cause a somewhat turbid varnish. Generally speaking, the tri-acid stearate of aluminum is the most promising substance for flatting. Direct grinding into the varnish has been found most satisfactory.

Other large-scale industrial applications of the stearates include their use in crayons and their use as anti-oxidants in transformer oils. All told, more than a dozen different industries now use the stearates in large quantities in the manufacture of numerous products. They have demonstrated a usefulness and value to industry far beyond even the wildest dreams of that Mallinckrodt salesman who fifteen years ago predicted that aluminum stearate would make a valuable lubricating grease out of a worthless oil.

Dunite Improves Superphosphate

Use of magnesium silicate (olivine) in form of the basic rock, dunite, for the purpose of neutralizing any excess acidity and to improve the physical properties of superphosphate has been reported by D. W. Druschinin, *Z. Pflanzernernahr, Dungeng Bodenk*, 1936, 45, 303-5. Trials on different soils showed that superphosphates with dunite added gave higher yields than equivalent amounts of superphosphate alone. These results are attributed to the better distribution of the phosphoric acid in the mixtures, and to the presence of available magnesia and of colloidal silica.

Names of the Month—

A Current Supplement to the Chemical Who's Who

BARTHEL, Oliver Edward, consult. engr. (mech.); b- Detroit, 3 Oct. 1877; mar. Adele Gertrude Vargason, Detroit, 18 May 1906, 1 son; educat. pub. schls.; Detroit Bus. Univ.; pvt. instr. under Prof. D. Cole. Chas. B. King Co., draughtsman 1895-1901; Henry Ford Co., designer 1901; Cadillac Motor Car Co., chf. engr. 1902; Barthel Motor Co., promoter 1903; Ford Motor Co., experimental engr. 1904; Olds Motor Wks., experimental engr. 1905; Gt. Falls Power Co., asst. engr. 1906; Detroit, consult. engr. since 1907; Standard Steel Car Co., consult. engr. 1912-19. Designed "Lentz" fuelator for removing all non-combustible matter from gasoline and removing all non-lubricating matter from oil; holder 32 U. S. pats. for inventions. Memb. "The Living Age Magazine" (advisory conc.); Nat'l. Counc. of Nat'l. Economic League; Soc. Automotive Engrs.; Am. Soc. Mech. Engrs.; Detroit Eng. Soc.; F. & A. M., Palestine Lodge No. 357; R. A. M., King Cyrus Chapt. No. 133; K. T., Detroit Commandery No. 1. Clubs: Detroit Yacht; Ingleside; Noontide; Automobile. Hobbies: gardening, clay modelling, yachting. Address: 2324 Dime Bank Bldg., Detroit, Mich.

DEMAREST, Millard, dir., tech. sales devel. dept., Celluloid Corp.; b- Hackensack, N. J., 15 Aug. 1897; mar. Ellen Walden, Hackensack, 1 Feb. 1922, 1 son, 1 dau.; educat. Brown Univ.; Pratt Inst., I.C.E. 1921. Celluloid Corp. 1921-37, quality control bd., factory 1921-23, sales, plastics div. 1923-27, asst. sales dir., plastics div. 1927-30, dir. sales, packaging div. 1930-36, dir., tech. sales devel. dept. 1936-37. A. E. F., 26th div., 1917-19; Boy Scout Troop Committeeman 1936-37. Memb. Delta Kappa Epsilon. Clubs: Franklin Lakes Rod & Gun. Hobbies: hunting, fishing, tennis. Address: 10 E. 40th St., N. Y. City.

DOOLITTLE, Arthur King, chg. res. and devel. wk. on coatings, Carbide & Carbon Chemicals Corp.; b- Oberlin, O., 15 Nov. 1896; mar. Dortha B. Bailey, Oberlin, 8 Aug. 1923, 1 son, 1 dau.; educat. Columbia, A.B. 1919, B.S. 1920, Ch. E. 1923. The Dorr Co., res. engr. 1923-25; Sherwin-Williams Co., plant engr. 1925-29, chf., lacquer div. 1929-31; Bowen Res. Corp., devel. engr. 1931; The Bradley & Vrooman Co., dir. lacquer res. 1931-32; Carbide & Carbon Chemicals Corp., protective coatings res. 1932 to date. U. S. A., 2nd Lt. 1918-19. Res. on solvents, plasticizers, resins, spray drying. Memb. A. C. S.; A. I. Ch. E.; A. S. T. M. Clubs: Columbia Univ. (N. Y. City). Hobby: motorboating. Address: Carbide & Carbon Chemicals Corp., S. Charleston, W. Va.

FURMAN, N(athaniel) H(owell), prof. chem., Princeton Univ.; b- Lawrenceville, N. J., 22 June 1892; mar. Hannah S. Hendrickson, Lawrenceville, 23 Aug. 1919, 1 son, 1 dau.; educat. Princeton, B.S. 1913, M.A. 1915, Ph.D. 1918. U. S. N., jr. chem., 1916; Stanford Univ., instr. 1917-19, visiting prof. summer 1926; American Univ., C. W. S. 1918; Princeton, asst. prof. 1919-27, assoc. prof. 1927-37, prof. 1937. U. S. A., C. W. S., pvt. 1918. Author (with I. M. Kolthoff) "Potentiometric Titrations" (2 eds.); (with H. H. Willard) "Elementary Quantitative Analysis" (2 eds.); translator "Volumetric Analysis" (2 vols.), "Indicators" (1 vol.); contr. author to Taylor's "Physical Chemistry," "Annual Survey of American Chemistry," Margosches' Die Chemische Analyse." Res. on electrometric methods of chem. analysis; ceric sulfate as a volumetric oxidizing agt.; oxidation-reduction studies. Memb. A. C. S. (off. div. phys. inorg. chem.; sec., v-chmn., chmn. 1933-35); Electrochem. Soc.; A. A. A. S.; Am. Assn. Univ. Profs.; A. I. C.; A. S. T. M. Club: Cloister Inn. Hobbies: golf, travel, book collecting. Address: Frick Chemical Lab., Princeton, N. J.

SIMS, Clarence E., supervising metallurgist, Battelle Memorial Inst.; b- Chicago, 1 July 1893; mar. Corinne T. Landgraf, Madison, Wis., 28 July 1920, 2 daus.; educat. Univ. Ill., B. S. Chem. Eng. 1915; Univ. Utah, M. S. Metallurgy 1916. Anaconda Copper Mining Co. 1916-17; Aluminum Co. of America, 1919-21; U. S. Bur. of Mines, supervising metallurgist, 1921-26; American Steel Foundries, asst. dir. res., 1926-36. C. W. S., res. div. 1918. Recipient Robert W. Hunt award A. I. M. E. 1933. Memb. A. I. M. E.; A. S. M.; A. F. A., dir.; Sigma Xi. Hobbies: golf, swimming. Address: 505 King Avenue, Columbus, O.

"Why Chemists Get Fired"

So frequently do we hear adverse criticisms of the qualifications of the younger technical men employed in industry that with the purpose of determining whether this was primarily a problem of personality or of education, or of both, we have collected from representative operating and research executives in scattered fields their answers to the question "Wherein do you find these men lacking for your work?" The answers published below are an extremely significant contribution to this fundamental problem.

More Fundamental Science

By Milton C. Whitaker, D.Sc.
Vice President, American Cyanamid Co.

The industries need, especially in their research and development organizations, men well trained in the fundamental sciences. A group of such men, highly specialized in some particular field, can, by proper management be coordinated to produce results far beyond the scope of any individual worker.

Special application studies, except in so far as they are used to illustrate the methods of applying fundamentals are, in my judgment, a waste of time.

The outstanding difficulty we have with many of the young technical men who come into industry, is that they have been exposed to good training in the fundamental sciences, but that it did not take. They have seen and handled these tools, but they are unable or unwilling to use them skilfully. Our problem is, therefore, to pick men who have acquired a substantial amount of fundamental working knowledge and who, at the same time, are capable, either through natural or cultivated talent, of applying it to the problem in hand.

Discarding Cap and Gown

By Charles S. Venable
Director Research, Viscose Company

My chief criticism of recently graduated chemists and chemical engineers is the inability of the average to discard the cap and gown when they enter commercial work. It takes from six months to two years to get rid of that cap and gown and, in the meantime, one has to appoint a committee to keep some hard-headed foreman from slugging the educated marvel. To work effectively with men, one must speak their language—not down at them but on a level with them. The best ideas or the keenest calculations are of no value unless put into operation. That requires cooperation with those working around you.

The writer doubts as to whether the defect described above can really be overcome in a college course. It is largely a question of experience and a common sense adaptation of the individual to his surroundings. However, it would do no harm for some respected executives to be called in two or three times a year to tell the boys that the ability to get along with one's fellow men is apt to be responsible for 70 per cent. of one's future usefulness.

Weak Foundations

By Gilbert E. Seil
Technical Director, E. J. Lavino & Co.

The newest crop of young chemists and chemical engineers has a peculiar attitude toward industry. They are more interested in themselves as members of a class than as individuals. Without exception, the young men who apply for positions today insist upon permanent employment at a fixed rate of salary and a minimum number of hours per day. After they are employed, at least for the first year, they are most careful to come to work at the very latest moment and prepare to leave at the very earliest moment allowable.

In our Technical Department we try to educate these youngsters to make them realize that before they can receive a larger salary they must first earn it. We try to impress upon them that they cannot wait until they get a larger salary before they make an effort to earn the larger salary. This, of course, is a matter of personal attitude and can be traced back either to their family thought or to the teachings of a faculty member in their schools who has not had enough experience in industry to reason logically, using as a basis for his reasoning, real premises rather than imaginary ones.

On the other side we have the educational problem. The young graduate comes to industry with a slight smattering of superficial knowledge. He has taken courses not only in the true sciences, but, in a majority of cases, the pseudo sciences have been stressed many times beyond their value. Now it is not my opinion that the pseudo sciences ought not be taught, nor is it my opinion that the various social systems be neglected, but it is my opinion that too much stress must not be placed on these so-called sciences.

The young graduates are particularly weak first, in a language; second, in mathematics; third, in chemistry; and fourth, in physics. I find that the students who

have been well trained in these four subjects are far superior to the students who have spread their educational efforts over unnumbered subjects. The reasons for my opinion as to the proper method of educating young technical men are the following:

1. It is necessary for a young man to know one language well in order that he can express himself so that others can understand him and so that he can understand what has been written. More than one language is an advantage in that it is an aid to the graduate's understanding of the literature.

2. Mathematics is essential because it not only teaches the proper relationships, but also teaches definite methods of reasoning. Unfortunately, most students who study descriptive geometry and calculus finish these subjects without having any idea whatever of the value of mathematics in reasoning. It is for this reason that most of them dislike these courses. If the instructors in calculus knew something about calculus other than the mathematical mechanics and would stress to the students the mechanics of the reasoning used in calculus, the students would enter their post-university life well equipped to solve the problems with sound reasoning.

3. Today a real knowledge of chemistry is most important and although I have used physics as a separate subject, I doubt very much whether such a separation is proper. The line of demarcation between physics and chemistry is becoming less distinct day by day. However, the universities differentiate between these two subjects very definitely. It is unfortunate that chemistry is taught as a group of partially related facts and its underlying principles are sadly neglected. I believe that this is due to the fact that young students of the same university are quite often continued in the university as instructors. It is a rarity to find any student, post-graduate or otherwise, who has any real conception of the principles of chemistry. Chemistry is by far the most systematic of our sciences, yet the system of chemistry is rarely taught in the universities.

4. Unless a student specializes in physics, his knowledge is also superficial and it is taught in such a way that it is impossible for the student really to understand the subject. In every curriculum which I have examined, a student is taught elementary physics before he has had calculus and I would like to have a committee which prepares a curriculum explain to me how any student without a thorough knowledge of calculus can understand elementary physics. The treatment of physics, chemistry and mathematics in the university is entirely too far on the side of mental concepts rather than on the side of material application. These subjects can be made most interesting if properly prepared instructors teach the students. Most universities are unfortunate in the type of a staff which they acquire for instructions in these four major subjects, because the instructors do not make the subjects interesting enough to students and because the instructors themselves do not thoroughly understand the subjects.

Any person who has a thorough knowledge of the subjects which I have named, can do any kind of scientific technical work efficiently. Any of the pseudo sciences which he has learned at the university or read about later, are, of course, beneficial if the proper weight is placed on the subject matter. I am opposed to trying to make an encyclopedia out of a student. I should prefer to teach fundamental principles and how to use the literature so that he can find the facts.

Personality Problems

By J. W. Bodman
Research Director, Lever Bros. Co.

The younger chemists and engineers are, for the most part, adequately equipped by education to handle the technical problems confronting them in industry. That they frequently fail to live up to our expectations is, we believe, a personal problem. The difficulty faced by the young technical graduate might be largely avoided by suitable emphasis in educational institutions of the broader personal aspects of successful application of technical knowledge.

The young technical graduate is usually a very poor salesman of himself and of his ideas—simply because he fails to realize that the value of neither is self-evident to his superiors and to his associates.

Indictment and Suggestion

By M. F. Taggart
Director Research, O'Brien Varnish Co.

The subject is a very pertinent one and gravely serious.

We find a great fault in our present technical men in that they lack the power of self expression either oral or written. Simple sentence construction seems difficult. Vocabularies are restricted to ordinary adjectives, verbs and nouns without use of more expressive, descriptive words or phrases. For example, a varnish film is referred to as being "hard." That simple sentence is the limit of expression, whereas synonyms permit of repetition of the statement for emphasis such as describing the same varnish coating as being "dense," "compact" or "non-plastic."

Compound sentence structure becomes just a jumbled jargon of conflicting tenses; singulars are used for plurals, pronouns are massacred. For example, "he don't" is forever with us for "he does not." "I seen" is prevalent.

We expect a technical man, after a sufficient period of training, to be able to address a paint-minded assemblage with credit to himself, the product, and the company. Less than 5 per cent. of the technical staff can discharge such a responsibility.

Speaking less specifically, we find a peculiar disdain or lack of respect on the part of technical men for the veteran non-academically trained man with whom he must cooperate and quite often lean upon under pressure. Thus the technically trained man excavates only deeper and more surely his own industrial grave.

Further, technical men too often seem to give no thought or wonderment to "from where does my salary come." No realization of what is required by way of gross sales to underwrite the technical man's salary ever exists in his mind. Requests for salary increases are never predicated upon any better justification than duration of employment, increased standard of living, or contemplated marital responsibilities.

The above indictment demands a suggested remedy. Our engineering schools, through lay lecturers of proven industrial leadership, should give our embryo technicians the benefit to be gained by hearing cold economic facts with the disguise of "holier than thou" removed.

The Mother Tongue

By V. L. King
Technical Director, Calco Chemical Co.

One of the most outstanding faults, if one is looking for faults in the young men, is their inability to use ably the English language. The writing of simple reports and the expressing of themselves verbally seem to be two things in which they are notably deficient. In fact, we train them in these points after they come here.

The Whys of Childhood

By Sydney H. Hall
Director Research, General Plastics, Inc.

What failures we have among recent graduate chemists and chemical engineers can be pinned to one thing—failure to comprehend why they are doing what they are, either development or production, in relation to the prospective or actual customer.

This failure is undoubtedly a combination of inborn characteristics and training.

The more effectively the colleges can bring back the "Why's" of childhood, that we impatient parents are so prone to stifle, the more successful will be their graduates. In general the stronger minds retain their inquisitive characteristics to a greater extent, a quality which is essential in successful chemistry.

Personality and Perspective

By E. A. Rykenboer
Gen'l Mgr., R. & H. Chemicals Dept.
E. I. du Pont de Nemours & Co.

The problem of finding candidates whose personalities appear promising from the standpoint of eventual usefulness in production or sales work is at least as great as finding men with adequate technical training. Good men come from all schools, and men whom we will not consider, graduate, and have good recommendations from practically all schools. There seems to be no feasible method of preventing a young man with high perseverance and fair mental caliber from obtaining technical training, no matter what other undesirable qualities he may have. This difficulty could perhaps be met in part by encouraging other types of students to take technical courses, and possibly also by anything which would definitely develop the student's personality.

There is no method by which the industrial men requiring help can avoid the responsibility of selecting candidates of good character and personality from among the large number who satisfactorily complete their academic work. Technical leaders in industrial work should spend more time keeping acquainted with the faculties of the colleges from whom they draw their students; likewise, the educators could profitably maintain varied contacts with executives in the industrial field. A closer contact between academic and industrial men, if continued, will tend to iron out any differences in their points of view.

A major criticism which is justified as to current curricula is perhaps that some schools, especially the smaller ones, are too ambitious to put in large numbers of so-called advanced courses to the neglect of fundamental ones. This is not by any means a general criticism since there are many moderate-sized schools which are outstanding exceptions. Individual candidates of general promise will be lacking in one phase or another of their assimilated knowledge; this, of course, is most apparent in the four- or five-year men. The chief shortcoming of these candidates we have interviewed has been an almost complete lack of any system or organization of the facts which have been presented to them during their courses in general, qualitative, organic, and physical chemistry. They need some method of fixing or correlating the facts.

Few of these men know anything about personalities or companies in the field of chemistry. A short course in chemical biography in the senior year should go a long way toward broadening the knowledge of these students. A general review of American chemical industries would be beneficial so that candidates will not be lacking in their knowledge of the fundamental processes employed in chemical manufacturing and of firms who manufacture particular products.

Reason: Not Memorize

By Ernest Scheller
Director Research, Reynolds Metals Co.

It appears that the training of young chemists and chemical engineers has been quite satisfactory and the difficulties lie mainly within themselves in that too few of them have the ability to think clearly and arrive at conclusions from their own observations rather than from what they have learned or have been taught in the past. They take too much for granted that their education is completed and do not spend enough time in outside studies and in refreshing the theories and fundamentals which they have been taught. It also appears, in most cases, that they have very little understanding of the concept of these theories and although they

perhaps know what they are, nevertheless they do not seem to realize their application and recognize their limitations.

My first suggestion for these youngsters would be that they be trained in a little more straight thinking and common sense as applied to chemistry, rather than in memorizing as now seems to be the practice. In this respect, I might suggest that original problems be submitted to them, in which they would be allowed to use any books at their command and in which they can arrive at the solution in any form whatsoever rather than be confined to any particular equation or formula; that they be taught a little more regarding the philosophy of research and the sciences and that there is a vast difference between knowing and understanding. For instance, a hundred persons may observe a certain reaction or change that may take place in the test tube, but there may be only one who truly has the imagination to appreciate and understand what is going on.

The One Great Weakness

By Robert E. Wilson
President, Pan-American Petroleum & Transport Co.

In my experience the greatest weakness of the average chemical engineer today is in the lack of ability to assemble a good report which is at once well organized, clear, and persuasive.

Too Early Specialization

By Louis Weisberg
Consulting Chemical Engineer

I find that many of the younger chemists and chemical engineers lack thorough training in the fundamental subjects of chemistry and physics. This is true even of men from the leading schools in the country.

This situation is the result of too early specialization. Not much specialized information about particular branches of chemical technology can be included in the ordinary four or five year course without crowding out the broad fundamentals. If these fundamentals are not learned while a man is at school, he seldom picks them up later. Information relating to special fields of technology is more readily picked up after a man leaves school. Accordingly, the time in school should be devoted as far as possible to fundamental subjects.

To some extent industrialists, rather than the schools, are responsible for this situation. Industrialists in various lines have put pressure on the schools to train men for their special needs, and the schools have responded by introducing new courses. This very short-sighted policy is good neither for industry nor for the student. Such special courses are a splendid thing for the man who already has the fundamentals well in hand, but they do not belong in the undergraduate curriculum.

Specialization can be overdone by Ph.D.'s too. A considerable proportion of them seem not to realize that it is just as important to be an all-around chemist as it is to be a physical chemist or an organic chemist.

Men with sound fundamental training make the most useful employees in the long run. They may take a little time to get familiar with the field in which they are to work, but in the end they more than make up for this.

Writing and Costing

By John V. N. Dorr
President, The Dorr Co.

I have given the matter some thought myself and have also obtained the opinions of subordinates, one of whose duties is to search out and interview desirable young engineers in the chemical field. Generally speaking, I would say that young chemists or chemical engineers are badly equipped in one or more of the following:

1—Self expression
2—Correspondence
3—Realizations of the importance of costs
4—Breadth of outlook

These faults might be corrected in a major degree through courses in Public Speaking and Debating, Business Correspondence and Report Writing, Economics, Accounting and Cost Accounting, more Liberal Arts courses, and better planned reading.

In this connection it may be of interest to you to known that The Dorr Company has recently inaugurated an educational program for its employees, which course we hope will eventually cover courses of this general character.

Inept Chemists

By F. B. Carpenter
Chief Chemist, Virginia-Carolina Chemical Corp.

In employing young men we have had quite varied experiences. Some of these men, I am satisfied, should never have taken up chemistry as a profession. In other instances their college training has not properly equipped them for practical analytical work.

It is evident that some schools do not give their students sufficient training in the laboratory and when they take a position they have to be taught fundamentals that should have been learned in college. There is wide variation in the manner of training and amount of practical work given students as it applies to different colleges.

I would say therefore, that as a general proposition from the standpoint of college training, the two main points to be considered are as follows:

First, discourage from continuing the course any student who does not have an aptitude for science.

Second, a more intensive training in practical laboratory work should be required of those who intend to follow industrial chemistry as a profession.

(Continued in October Issue.)

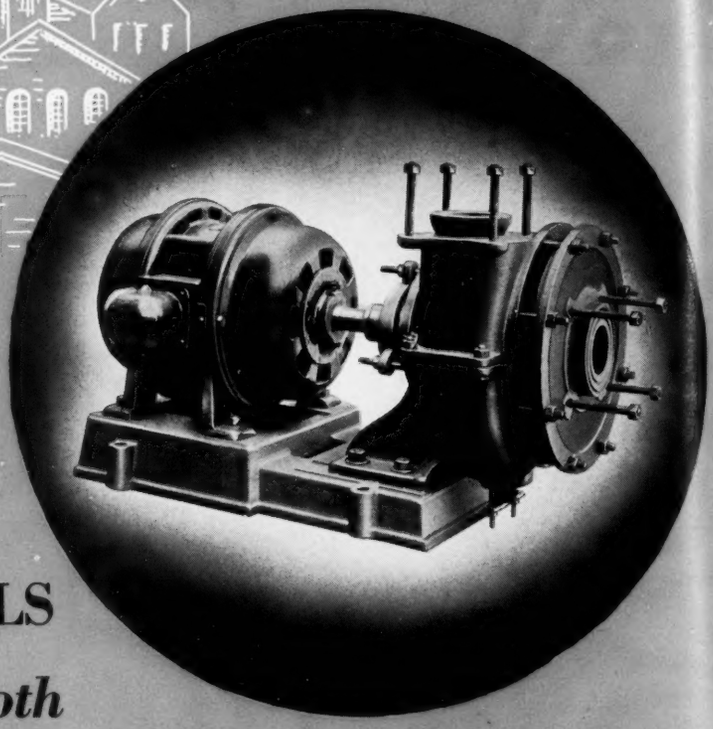
Plant Operation and Administration

Oyster-shells as a source of lime at the Mathieson Lake Charles works

A Digest of New Methods and Equipment for Chemical Makers

In this plant

A SINGLE CENTRIFUGAL PUMP



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Cast Irons of Chemical Engineering Interest

By Dr. A. B. Everest

WHILE there are many reasons for the adoption of cast iron for chemical castings, the metal in practice is frequently found to have its limitations. In the first place, cast iron in common with all metals used in the cast form, is prone to a certain amount of unsoundness and segregation, on account of which porosity with resultant physical weakness is liable to develop, and in heavy sections particularly, such porosity and open grain may lead to lack of the usual good wear, corrosion, and heat-resisting properties of the metal. Consequently in considering cast iron for chemical industry a distinction is necessary between the properties of the cast iron itself and of castings produced from that iron.

Development of special cast irons has been directed largely in two major directions. First, attention has been given to control of the impurities and inclusions in the metal so as to minimize the interruption of the matrix by these inclusions, and consequently to produce an alloy of improved physical properties more nearly approaching those of the steels. Coupled with this improvement is the question of minimizing porosity and segregation in the castings generally, thus enhancing their value and service in industry. Second, attention has been given to the modification of the matrix in the metal, and today, just as we have the heat-treatable and the corrosion-resisting steels, we now have cast irons in which, by modification of the matrix generally by means of alloy additions, special properties of heat-, wear-, and corrosion-resistance previously unknown in cast iron are now available.

One of the most important influences in the development of special cast irons has been the increased use of alloy additions. It has been realized from the earliest days that by mixing metals, alloys of improved properties could be produced.

As a result of investigations made in recent years, cast iron is now alloyed with a wide variety of metals. These include such elements as silicon and manganese (in proportions greater than those normally found in cast iron), nickel, chromium, molybdenum, copper, vanadium, titanium, tungsten and aluminum. Investigations have established that these elements have different effects in cast iron and many of them are subject to strict limitations. Thus vanadium and titanium are used only in small proportions and serve to refine and deoxidize the metal; tungsten so far has been little used in cast iron and its influence is as yet not fully understood.

Copper is of great interest today and is being used in small proportions in castings of different types. Copper, however, suffers from the limitation that its solubility in cast iron is strictly limited, and according to the nature of the iron is given as anything between 0.5 per cent. and 3 per cent. Chromium and manganese can be added over a wide range of proportions to cast iron, but above small quantities the affinity between these elements and the carbon in the iron is so great that massive carbides are formed which render the final castings hard and difficult to machine. Alloys containing high proportions of chromium have been used recently for special applications where machining is not necessary, and these alloys are characterized by a high degree of heat resistance. They are, however, difficult to produce. Molybdenum is generally used in small proportions; it tends to form carbides, which limits its usefulness in castings. Aluminum has been investigated thoroughly and an interesting series of alloys produced. In this case again, production difficulties, notably the occurrence of unsoundness due to alumina, have hampered the development of aluminum cast irons on a commercial scale.

Nickel, on the other hand, has proved the most useful of the alloy additions to cast iron. It can be alloyed with cast iron in all proportions, giving a series of metals with a wide range of properties which offer combinations of qualities of interest in many types of special applications in the chemical and allied industries; the usefulness of nickel is also further enhanced by the fact that it is stable in the casting, not being lost by oxidation on remelting.

Small additions of nickel up to 2 per cent. have proved useful in controlling the grain size and physical properties of good-quality cast iron, so that, as detailed below, these alloy cast irons have proved of value where castings of improved quality are required. Additions above 2 per cent., as in the case of the steels, harden the matrix. At about 5 per cent. nickel, the alloys are air- or self-hardening, owing to the influence of nickel in lowering the critical points at which constitutional change takes place in the metal. At this percentage of alloy addition the matrix of the iron is in the hard martensitic form. These irons are machined only with difficulty, but are of special interest for their abrasion resistance, though not perhaps of great value from the corrosion-resisting point of view.

Further additions of nickel result in a series of irons of gradually decreasing hardness, until round about 16 to 20 per cent. the castings are soft again and may be easily machined. The decrease in hardness is due to the gradual replacement of the martensitic matrix by austenite, this change being complete at about 20 per cent. nickel. The austenitic cast irons are corrosion- and heat-resistant and show at the same time good resistance to abrasion and wear. It is this series of alloy cast irons which has, perhaps, proved of greatest interest to chemical engineers.

The interest in the low-alloy cast irons (*i.e.*, cast irons containing up to 2 per cent. special elements) does not lie primarily in the influence of alloy additions on the corrosion-resistance of the metal itself. Such alloy additions, however, have a profound indirect effect on the quality of the castings, and it is this indirect effect which is of the greatest importance to the chemical industry, especially since the use of such alloy additions nearly always demands improved foundry technique and control over the metal, resulting in greater uniformity, density, and quality in the castings.

This point is best brought out by considering the case of cast-iron pots for concentrating caustic liquors. In the case of castings of this type, manufacturers from time to time have experienced considerable trouble due to localized attack. In fact it is quite a common experience to find that pots, which have been in service for only one or two weeks, have failed due to a hole eaten straight through the bottom of the pot. In a case of this type, the metal in the pot itself, except for the localized attack, is hardly affected at all, but the localized attack has resulted in the speedy and premature failure of the casting as a whole. It has now been established, that the greater uniformity with freedom from porosity and segregation offered by a low alloy cast iron is effective in eliminating such local attack and thus ensuring a long useful life for the casting.

While the influence of small additions of nickel in promoting soundness and uniformity in the castings is of such vital importance and should appeal to all manufacturers of chemical equipment, it must not be overlooked that alloy additions actually have a small but definite influence in improving the resistance of cast iron to many types of chemical attack. For example, nickel improves the resistance of iron castings to caustic liquors, and it is reported that on the Continent even 3 per cent. or 5 per cent. of nickel is frequently used in caustic pots and other castings for the chemical trade.

In the low-alloy cast iron good control over the composition of the base iron is essential in order to obtain the best results from the alloy addition. The quantity of the carbon must be kept low. Silicon must also be kept under control so that nickel may exert to the full its refining effect on the form of the carbon. Phosphorus must also be kept low, since this element forms a complex eutectic which is of a hard and brittle nature and has a deleterious effect on the mechanical properties of the castings. These points must be borne in mind.

By the use of alloy additions, and especially by the use of special methods of preparing the base iron, it is now possible for engineers to expect a figure at least two or three times as great, and in fact it is today quite usual to obtain a strength of 22 to 25 tons per sq. in. in large castings. This improvement of strength is of importance in connection with many parts of chemical equipment where increased stress and pressure are required, as in pump bodies, valve bodies, and reaction chambers. Or alternatively, reduction in weight may be of importance in certain types of castings. This is now made possible by the modern high-strength alloy cast irons. A reduction in section thickness is attractive in certain castings, not only in reducing weight, but also in the increased efficiency which is available in the transfer of heat through the walls of vessels, or again in the reduction of energy required to actuate moving parts of massive section.

Wearing quality is of importance in many applications. Abrasion and erosion often account for serious deterioration of parts in service, and when coupled with corrosion they are responsible for the extremely short life experienced in certain types of equipment. The low alloy cast irons containing small proportions of nickel and chromium, giving a fine grain and superior hardness, are useful under these conditions. They are, in fact, extensively used for stirrers, impellers, and in other applications where resistance to abrasion is required. It should be mentioned that under particularly severe conditions some of the harder irons described below are frequently preferable.

One outstanding feature of the low-alloy grey cast irons is the ease with which they may be machined and the fine finish they take on. On this account they are especially suited for large castings in the chemical and process industries where such a finish is required. For example, in the paper industry the low alloy cast irons are being used for drying cylinders and similar applications where a high degree of finish and general all-round good quality are required with perhaps a measure of corrosion-resistance. They are also of use for rolls and drums in many types of crushing and food-preparing equipment.

Low alloy irons containing up to one per cent. chromium are of special interest for heat-resisting applications, where a grey iron is desired with freedom from growth and scaling in service. Chromium itself, however, tends to render the castings brittle in service, and for this reason chromium is frequently associated with an addition of up to one per cent. of nickel in order to ensure toughness in service.

Cast irons containing an intermediate proportion of alloy addition, as for example in the range 2 per cent. to 6 per cent., generally fall into the class of irons specially developed for improved wear resistance. Additions of chromium or manganese in this range result in hard and unmachinable castings, while nickel additions of the same order give a gradual increase in hardness with increasing difficulty in machining. In the case of chromium and manganese the hardness is due to the presence of massive carbides. In the case of nickel, however, it is due to hardening of the matrix, this gradually being rendered sorbitic and martensitic, these being the structures normally associated with hard tool steel. None of the alloy irons of this type has any very special virtue in the direction of corrosion resistance, but all the irons are of interest on account of their superior abrasion resistance.

Up to about 3½ per cent. of nickel the irons, while of increased hardness, are still machinable, and this type of alloy iron is of interest where a high degree of abrasion resistance is required coupled with machinability. Above 3½ per cent. of nickel the matrix becomes so hard and tough that machining is not possible or only carried out with difficulty. These irons are used for gears, pump parts, and other applications where a combination of toughness and resistance to wear is required.

If an even harder material is desired, then consideration can be given to the very hard white cast iron known as "Ni-Hard," in which the effect of chromium in the production of massive carbides is combined with the effect of nickel in giving maximum hardness of the matrix of the metal. White irons containing 4½ per cent. nickel and 1½ per cent. chromium ("Ni-Hard") have the highest hardness known among any of the cast commercial metals. Their abrasion resistance is correspondingly high, especially since the hardness is combined with toughness. Such irons are used for pump impellers and other castings subjected to extreme abrasion, while they are of special interest in crushing and grinding applications of all types where long life in service is essential.

Further additions of nickel with or without other elements lead to the development of the austenitic type of matrix. Between 6 per cent. and 16 per cent. nickel a mixed structure is obtained in which martensite gradually gives place to austenite. Austenite is itself tough and corrosion-resistant, and some of the irons of intermediate composition have been found of special interest where a combination of abrasion and corrosion is encountered. Thus cast irons containing 7 to 8 per cent. nickel with 2 to 3 per cent. chromium have been used recently for pump impellers and for other parts subject to light abrasion. Recent tests show that such irons possess many times the life of the harder white irons or of the special steels for high velocity pumping.

The first definite reference to the austenitic cast irons is, perhaps, that made by Dawson in 1923, who put on the market his non-magnetic alloy cast iron now known and used extensively under the name of "Nomag." In developing this iron Dawson found that cast iron alloyed with substantial proportions of nickel and manganese was soft and machinable and had the unusual characteristics of being non-magnetic and possessing a very high electrical resistance. This combination of properties was of special importance to the electrical industry, where non-magnetic alloys of high resistance were comparatively rare. The composition ultimately selected for "Nomag" was one containing nickel 10 to 12 per cent., and manganese 5 to 6 per cent.

Recent work on alloy cast irons has shown that other elements are also of importance in producing the austenitic structure. In addition to nickel and manganese as mentioned above, copper, chromium, and aluminum are also helpful but, as already explained, of these manganese, copper, and chromium all suffer from serious limitations and cannot be used by themselves. It is now appreciated that about 20 per cent. of nickel alone will give a completely austenitic cast iron. In combination with the other elements mentioned, however, nickel may be reduced substantially, being replaced in part by proportions of copper, which it carries into solution, or by manganese or chromium, in which case the carbide-forming tendencies of these elements are counteracted within limits by the presence of nickel. Aluminum has been found to give austenitic structures, but the irons in addition to being difficult to cast are unstable, since the carbon present tends to form aluminum carbide.

In addition to "Nomag" two other types of alloy known respectively as "Ni-Resist" and "Nicrosilal" are now well established in industry. The first of these is produced by the addition of nickel and copper, generally as the alloy "Monel," to give a composition of approximately 14 per cent. nickel and 6 per cent. copper to which is also added 2 per cent. chromium; while in the case of "Nicrosilal" a copper-free composition is used with about 18 per cent. nickel and in which an abnormally high silicon content has been adopted, this element generally being in the range from 4 per cent. to 6 per cent. From a paper to the Chemical Engineering Group, July 7, during annual meeting of the Society of Chemical Industry at Harrogate.

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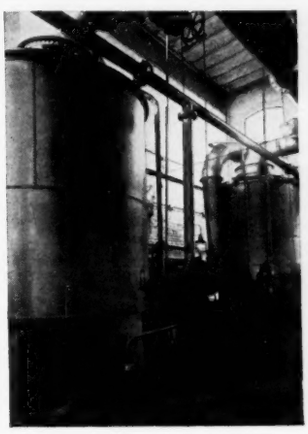

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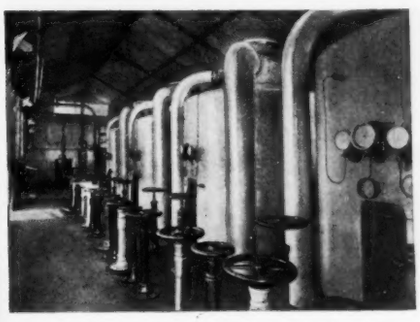

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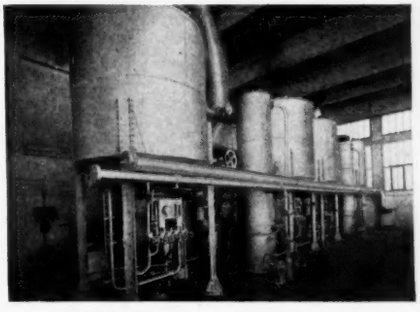
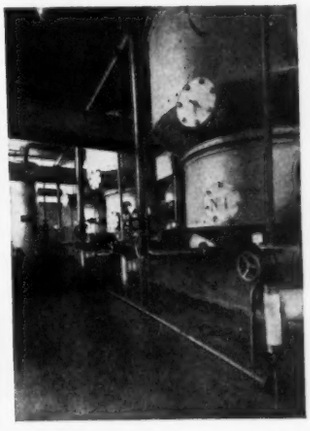
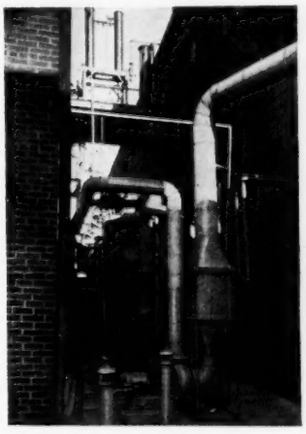


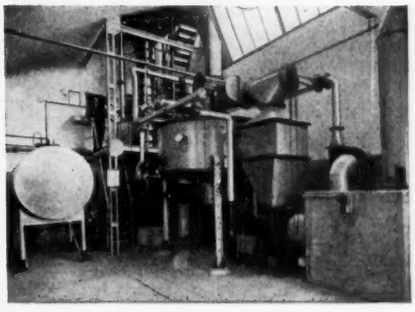
Modern four-adsorber installation recovering naphtha in a dry-cleaning plant. The solvent loss is less than 3% of the weight of garments cleaned.



Recovery of xylol and naphtha in a large gravure printing plant. This field was developed by Acticarbone.



Recovery and rectification installation in a fabrics coating plant. Capacity 2,000 pounds daily of acetone, ethyl acetate and naphtha.



Recovery and rectification equipment for alcohol in a celluloid manufacturing plant.

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Manufacture Soda Ash

According to recent reports from Japan, a plant in that country is now manufacturing soda ash by the liquid ammonia process at the rate of 50 tons per day. Apparently this is the first instance in which liquid ammonia has been used as a process material on the large scale in the heavy chemical industry, although research in the field is known to have been conducted in Germany, Russia, and elsewhere.

The solvent action of liquid ammonia for numerous inorganic materials has been recognized for long past, while it has also been realized that the very fact that liquid ammonia is not a dissociating solvent, as is water, enables numerous double decomposition reactions, incomplete or impossible in aqueous solutions, to be carried out. For instance, calcium cyanide of very high purity has been obtained for the first time by this method, though all endeavors so far to produce calcium carbide by the liquid ammonia technology have been unsuccessful.

The interest of liquid ammonia to the ammonia soda industry lies primarily in the fact that it enables the ready production of the intermediate carbamates which can, if necessary, be isolated owing to their insolubility in liquid ammonia. The method can be used even in those cases in which one or more of the reactants are only difficultly soluble in liquid ammonia, or where the reactions are equilibria. D.R.P. 600,485, for instance, describes a method for carbamate production by operating in several stages, so that in each stage less ammonia is used than would be necessary for the complete reaction. In this way a very pure potassium carbamate has been prepared from potassium chloride and ammonium carbamate. A suitable apparatus for the purpose is described in the German specification cited.

Although, as indicated above, the carbamates themselves are practically insoluble in pure liquid ammonia, they become very appreciably soluble in the presence of other salts, such as sodium chloride or ammonium chloride. The solubility of sodium chloride alone in liquid ammonia at 0° C. is about 11 per cent. At 25° C. the solubility appears to be about 16 per cent., but this may be due to the formation of addition compounds of the type $NaCl.5NH_3$. In the presence of other ions, the solubility of sodium chloride also increases rapidly. Ammonium chloride dissolves at the rate of 122 grammes per 100 grammes of liquid ammonia at 0° C., the concentrated solutions being highly viscous and difficult to filter. Addition compounds are probably formed in this case also, while there seems no doubt that the solution is in a meta-stable condition.

The gross reaction by which the formation of sodium carbamate in liquid ammonia takes place is represented by the following equation (1), while the intermediate reactions involved are represented by the equations below (2 to 5):

$$2NaCl + CO_2 + 2NH_3 + H_2O = Na_2CO_3 + 2NH_4Cl \quad \ldots \quad (1)$$

$$2NH_3 + CO_2 = NH_4CO_2NH_2 \quad \ldots\ldots\ldots \quad (2)$$

$$NH_4CO_2NH_2 + NaCl = NaCO_2NH_2 + NH_4Cl \quad . \quad (3)$$

$$NaCO_2NH_2 + H_2O = NaHCO_3 + NH_3 \quad \ldots\ldots \quad (4)$$

$$2NaHCO_3 = Na_2CO_3 + CO_2 + H_2O \quad . \quad (5)$$

It will be seen that among the systems which occur are two ternary systems. The first (*a*) is of importance, because as

(*a*) $NH_4Cl - NH_4CO_2NH_2 - NH_3$.

(*b*) $NaCl - NH_4Cl - NH_3$.

ammonium carbamate is more soluble in liquid ammonia in the presence of ammonium chloride, reaction (3) will be shifted to the right by increasing the concentration of sodium chloride. The second system (*b*) is also of interest, since the formation of ammonium chloride increases the solubility of sodium chloride in liquid ammonia.

This method of soda-ash production has recently been investigated in Russia, both in the laboratory and on the pilot plant scale, and the possibility appears to be that it will be adopted on the large scale. The work on the subject is reported by Wasiljew, Seferowicz and Fridman in *The Journal of Chemical Industry* of May and June this year, pages 719 and 818. These workers have accumulated data which have allowed the construction of isotherms for the two ternary systems referred to above. They have also investigated the thermodynamic aspects of the liquid ammonia process of soda ash formation. They find that the actual thermal effect of sodium carbamate formation is very small, the general inference being drawn that the action is independent of the temperature and the reaction time, provided the amount of sodium chloride used corresponds to its solubility at a given temperature. This means that the whole process up to the making of the sodium carbamate can be conducted at ordinary temperatures—a fact of technical importance.

The formation of ammonium carbamate by leading carbon dioxide into liquid ammonia is a very rapid reaction. It appears from the Russian results that the preliminary production of ammonium carbamate is better practice than the one-stage production of sodium carbamate by the prior solution of sodium chloride in liquid ammonia. By the latter method of working it is difficult to control the reaction properly. Further, since the formation of ammonium carbamate is exothermic, the heat of reaction causes some pressure fluctuations, while the use of autoclaves would introduce further difficulties. Again, since the equilibrium constant of the whole system depends only on the amounts of sodium chloride and ammonium chloride present, and as the solubility of each of these two compounds increases in the presence of the other, the reactions would come to a stop when the concentration of ammonium chloride passes the saturation point and the salt precipitates out.

The Russians have, therefore, decided to adopt the Japanese three-stage method. They first make ammonium carbamate, the yield being 100 per cent. This reaction can be carried out either at 0° C. or at room temperature, the speed being slightly increased in the latter case. The formation of sodium carbamate is completed within one hour at a pressure between not more than 7 atmospheres and with a yield of 95 to 97 per cent. on the sodium chloride used. The ratio, sodium chloride : ammonia, can be varied from 3:1 to 10:1 without any appreciable fall in the output. It is preferable to work at 0° C. to avoid corrosion troubles. The most appropriate constructional materials are tin, steel and chromium-plated metals, whereas lead is very rapidly corroded. The same remarks also apply to filtration and washing processes, for which special apparatus has been designed by the Russian workers, owing to the viscosity of the solutions.

The sodium carbamate obtained in this way must be thoroughly washed with liquid ammonia before steaming for the removal of all chlorine ions, since at the steaming temperature (300° C.) the reactions (4) and (5) are reversible. The soda ash finally obtained is stated to be of 99 per cent. purity, and the ammonium-chloride recovery of 93-95 per cent. purity, the balance being sodium chloride.

In the process as worked out on the pilot scale in Russia, ammonium carbamate is first prepared from liquid ammonia and carbon dioxide. In the next stage, sodium chloride is dissolved in liquid ammonia and the surplus ammonia evaporated. Reaction between the two solutions with the formation of sodium carbamate is then effected. The sodium carbamate is filtered off, washed with liquid ammonia and finally steamed. The filtered ammonium chloride is evaporated, all the spent ammonia being returned to process.

The question arises whether these processes employing liquid ammonia are likely to replace the ordinary Solvay process. They certainly have points in their favor. In the first place, no special purification of the initial sodium chloride is necessary, since the usual impurities in this material are insoluble in liquid ammonia. Consequently, there is the important advantage that the new processes enable the direct employment of solid sodium chloride, so that no preliminary solution is necessary when the salt supplies are not in the form of brine. Abstracted from *The Chemical Trade Journal*, Aug. 6, '37, p. 109.

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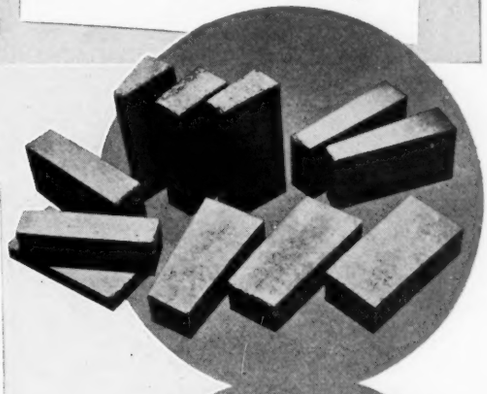

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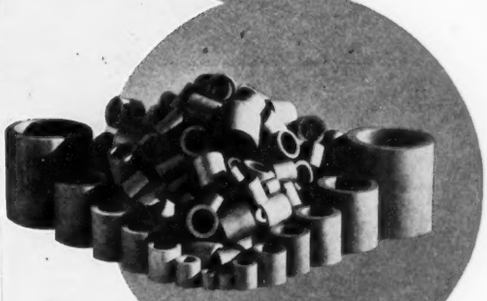

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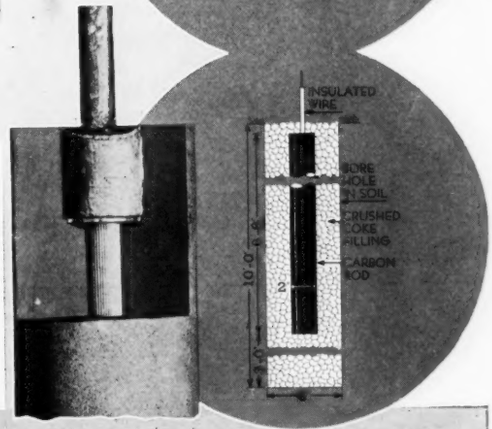

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Hydrogenation Carbonaceous Material

According to specification details, the object of E. P. 466,708, is to provide a process for hydrogenating carbonaceous material, using an electrolytic cell having a short ionic path whereby a comparatively low internal resistance is obtained and, at the same time, having means for preventing or hindering the contamination of the liberated cathodic products and *vice versa.*

In the cell described, the anode is separated from its associated cathode by a partition formed by trough elements so arranged that the lower part of one element lies below the upper portion of the element next below it so as to permit the flow of electrolyte and ionic current through the partition, but to hinder the passage of liberated anodic products and/or liberated cathodic products therethrough.

In one modification, each unit of an electrolytic cell comprises a plate-like anode and a plate-like cathode disposed in spaced parallel relation, and having interposed therebetween and also in parallel relation, a partition comprising a plurality of superposed and overlapping trough elements, which may be substantially V-shaped, for example. It is preferred to form the elements of silica, Pyrex, or Jena glass or the like, but other heat-resistant and corrosion-resistant materials may also be used. Cathodes may be made of any suitable material, but the anodes should be constructed of a noble metal or metals, or carbon or a base metal plated with a noble metal or metals, or carbon impregnated with such metals, or some other acid-resistant material. The electrodes may be of corrugated form, and may be perforated or formed of wire mesh of suitable gauge.

As electrolyte, an aqueous solution of sulfuric acid containing 30-5 per cent. of acid may be employed, or solutions of sodium sulfate and sodium hydroxide or sodium chloride and sodium hydroxide in varying proportions, or sodium hydroxide alone in solution.

The carbonaceous material is introduced in crushed form into the cell at a suitable pressure through conduits, and impinges on the brush-like projections of the cathode which hinder it in its downward path, so that it is subjected while in a pulverized state to the action of the hydrogen ions from the instant they are liberated at the cathode surface. The products vary, and in the reaction on coal, hydrocarbons are evolved varying as to specific gravity from 0.8 to 1.0, the heavier oils, it is stated, being given off at lower temperatures.

Production Glycol Ether

Use of tertiary amines and their corresponding quaternary ammonium bases as catalysts in manufacture of glycol ethers from olefine oxides and monohydric aliphatic alcohols is described in E. P. 467,228, issued to Distillers Co., Ltd.

Specification states it has been previously known to react alcohols with olefine oxides in presence of (a) acid catalysts, (b) neutral salts as catalysts, and (c) in absence of a catalyst, but with use of higher temperatures, *e.g.*, above 130° C. and pressures above 10 atmospheres. In this patent, glycol ethers are manufactured in a rapid, efficient and smooth manner by reacting olefine oxides and simple monohydric aliphatic alcohols, using as catalysts tertiary aliphatic, tertiary heterocyclic, or tertiary aromatic amines or their corresponding quaternary ammonium bases, or hydroxy amines such as tri-ethanolamine.

Reaction may take place under atmospheric temperature and pressure, but preferably at suitably inter-related temperatures and pressures sufficient to maintain the reactants liquid. For example, it has been found that the interaction of ethylene oxide and ethyl alcohol proceeds rapidly at temperatures between 60 and 100° C. and pressures between 5 and 10 atmospheres in presence of trimethylamine.

Following is an example given to illustrate manner in which invention can be carried into effect:

A liquid reaction mixture consisting of ethyl alcohol, ethylene oxide and triamylamine (as catalyst) and containing 70 grammes per litre of ethylene oxide and approximately 5 per cent. by weight of the catalyst was passed continuously first through a preheater heated to 100° C., and then through a reaction vessel maintained at 110-120° C., sufficient pressure being maintained on the apparatus to keep substantially all the reactants in the liquid phase. The hot reaction products were cooled under pressure, let down to atmospheric pressure and distilled. At a rate of flow of liquid reaction mixture of approximately 2 litres per hour per litre of free reaction space, approximately 95 per cent. of the ethylene oxide passed was converted into a mixture of ethylene glycol monoethyl ether (75 per cent.) and polyethylene glycol ethers (25 per cent.) Under similar conditions, but using only 2.0 per cent. triamylamine, the conversion of ethylene oxide per single pass was only 50 per cent.

Recovery CO_2 from Waste Gases

The principles and results of a pilot plant test of the Macmar process for recovery of carbon dioxide from waste gases, whereby very pure CO_2 can be obtained with high efficiency from gases poor in it, are described by Martin and Killeffer (*Ind. Eng. Chem.*, 1937, *29*, 632-636). In place of the direct absorption in K_2CO_3 solution, as normally practiced, the CO_2 in the waste gases is caused to react with gaseous NH_3, forming ammonium carbonate, which is absorbed in K_2CO_3-$KHCO_3$ solution, from which the ammonia is re-evolved by the reaction:—

$$(NH_4)_2CO_3 + K_2CO_3 = 2KHCO_3 + 2NH_3$$

so that a continuous circulation of ammonia is kept up in the absorption tower. CO_2 is boiled off from the lye in the usual manner, and washed free of NH_3.

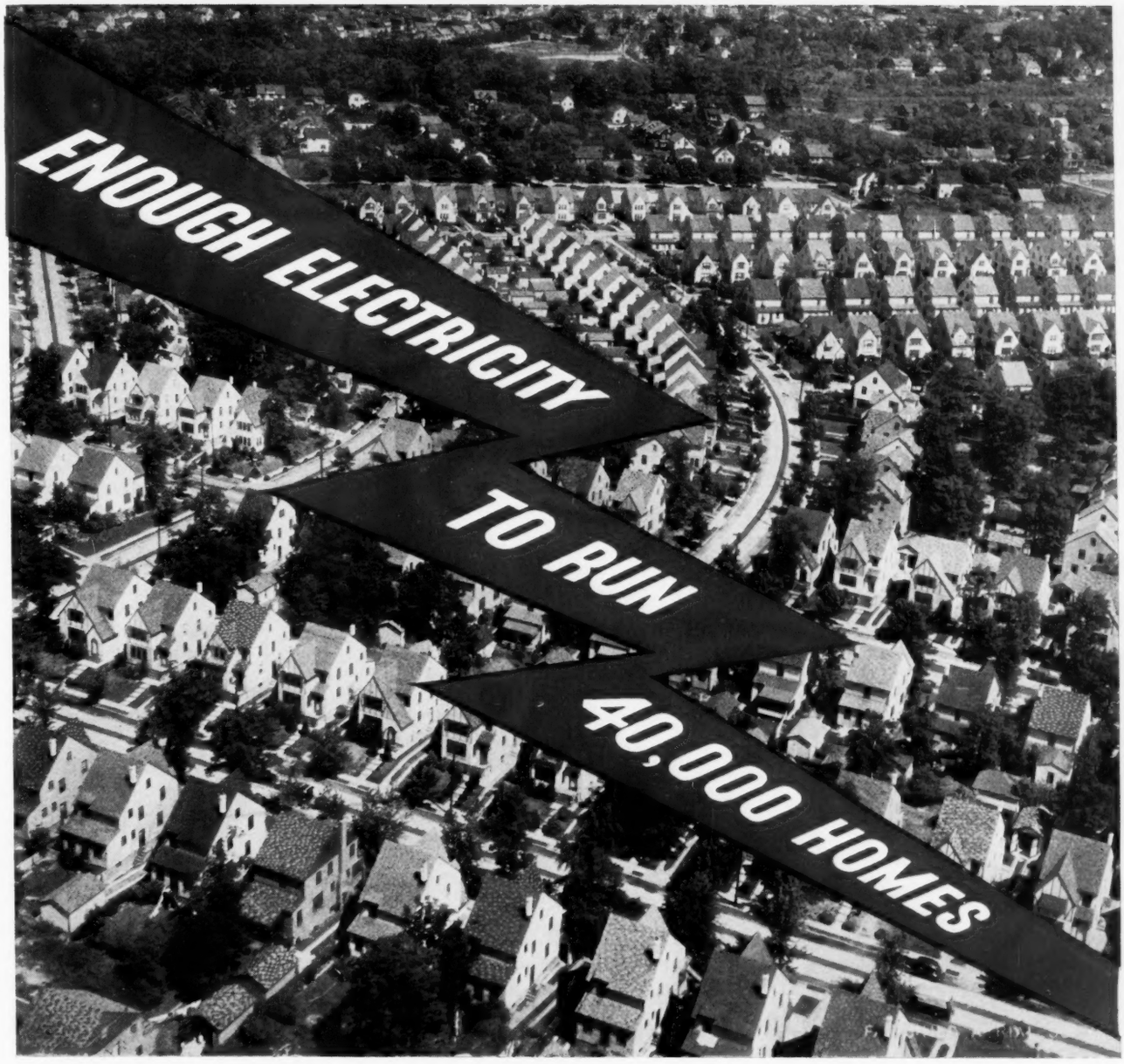
In a pilot plant test (capacity ½-ton of CO_2 per day) the efficiency of absorption decreased from about 80 per cent. for gases containing less than 7 per cent. CO_2 to 42 per cent. for a 16.2 per cent. content, while in the ordinary alkali process, the efficiency increases from below 10 per cent. to 30 per cent. in this range. The loss of ammonia was about 0.1 per cent. An increase of capacity was obtained by packing the absorption tower with steel shavings instead of coke. The increased efficiency is said to be due to the very rapid reaction of the ammonia and carbon dioxide, and the much greater solubility in carbonate lye of the ammonium carbonate thus formed than of CO_2 itself. The NH_3 functions as a catalyst in dissolving the CO_2. The process should prove very valuable in dealing with the waste flue gases of power plants, whose CO_2 content falls within the region where high efficiency is obtained with the new process.

Synthesis Chlorinated Naphthols

A process for synthesizing chlorinated naphthols commences from a chlorinated naphthalene which is reacted with a caustic alkali. To obtain 4-chloro-l-naphthol, the starting material is 1,4-dichloro-naphthalene, pressure reaction of which with potassium hydroxide leads to substitution of one atom of chlorine by a hydroxyl group. Details of this method (French Pat. 807,536) are as follows: 150 grams 1,4-dichloro-naphthalene, 200 grams potassium hydroxide and 500 c.c. methyl alcohol are heated in an autoclave for 20 hours at 190° to 210° C. with a copper coil as catalyst. After termination of the reaction, the mixture is cooled, the alcohol distilled off, and the residue filtered and acidified with dilute sulfuric acid when 4-chloro-l-naphthol separates as a brown oil which is purified by fractional distillation in vacuo.—*The Chemical Age*, July 31, '37, p. 106.

Colloidal Sulfur Preparation

Colloidal sulfur in the dry state or in concentrated suspension is obtainable by atomizing the initially formed suspension in a current of air or inert gas maintained at a temperature of 80 to 150° C. according to French Pat. 807,860.



An average home uses about 42 kilowatt hours a month. The *Calco Plant* at Bound Brook uses more than enough electricity for 40,000 homes every day of the year.

In itself the daily production of more than 60,000 kilowatt hours of electricity is a sizeable undertaking. Yet this is typical of the large-scale operations that are necessary in the manufacture of Calco's wide range of dyestuffs and intermediates by modern methods—and under the most precise control of highly specialized chemists and technicians.

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Electrolysis Alkali-Sulfate

For many years, methods for the simultaneous production of caustic alkalis and sulfuric acid by electrolysis of alkali metal sulfate solutions have been investigated in the United States, Germany, Russia, and elsewhere. Methods of this type are said to be actually used in some plants on a relatively small scale, but the whole of the technical problems involved have not yet been solved. The main difficulty lies in the selection of the anode metal.

Lead has proved the most suitable material, but lead anodes have the disadvantage that the surface layer is gradually removed by anodic oxidation, as a result of which lead may be deposited on the cathode and may contaminate the products separated out at the cathode. To obviate this drawback it is proposed to use alloys of lead containing silver in amounts up to the eutectic concentration of about 2.5 per cent., to which alloys small quantities of arsenic could also be added, if desired, for the purpose of hardening the lead.

When carrying out the electrolysis of alkali metal sulfate solutions it has been found that both anodes of pure lead and anodes containing a small proportion of silver undergo a constant decrease in weight caused by the lead peroxide formed on the anode during the electrolysis flaking off. In cases where the anodes consist of a lead-silver alloy containing arsenic in addition, the anodes undergo an increase in weight in the course of time, the lead peroxide forming on their surface accumulating to form thick solid layers. Ultimately these layers become so thick that any slight mechanical action, even of the oxygen bubbles generated at the anode, causes them to fall off.

According to developments detailed in E. P. 466,946, the wear on the lead anodes can be practically completely suppressed if the silver content of the lead be raised above the eutectic concentration of 2.5 per cent., and advantageously up to about 7.5 per cent., and if at the same time care be taken, by cooling the anode in a manner known per se, to ensure that the temperature of the anode is always kept below about 50° C. during the electrolysis. By operating in this manner a completely colorless, clear anolyte is obtained. Arsenic can also be added to these lead-silver alloys; for example, an alloy consisting of 96 per cent. lead, 3 per cent. silver and 1 per cent. arsenic is suitable.

Recovery Sulfur from Coke-Oven Gases

New process, termed "Katasulf," for recovery, for ammonium-sulfate manufacture, of the hydrogen sulfide content of coke-oven gases, was described by Dr. Hans Bahr, in a paper to the fiftieth annual meeting of the Verein Deutscher Chemiker. Method, developed and operated by the I. G., allows more economical production of ammonium sulfate than by the saturator process, and is simple to operate. It works equally well with gases of any composition, and is independent of the cyanogen content of the gas.

In principle, process consists of the catalytic oxidation of the coke-oven gas, after suitable preliminary treatment, in the presence of excess of air. The sulfur dioxide formed by the oxidation of the hydrogen sulfide is absorbed in a solution consisting essentially of a mixture of ammonium sulfite and bisulfite. Part of the solution which has acted as the absorption medium is intermittently withdrawn from the process, and heated under slight pressure, after addition of a certain amount of sulfuric acid. Decomposition occurs with formation of ammonium sulfate and a certain amount of free sulfur. The latter is filtered off and the solid ammonium sulfate recovered in the usual manner. Systematic counter-current working is adopted, while the fuel consumption is kept low by heat-interchanging devices between the gases and the liquors in their various stages of processing.

The crude coke-oven gases are given preliminary washing and electrostatic detarring treatments, but their benzol content is not removed since the catalyst employed for the oxidation of the hydrogen sulfide is also capable of selectively oxidizing the unsaturateds contained in the crude benzol. Refining losses in the benzol recovered in the final stages are consequently very low, one of the advantages of the method residing in the increased efficiency it allows in the recovery of the benzol content of coke-oven gases.

The cyanogen content of the gas undergoing catalytic treatment is also oxidized to a mixture of carbon dioxide and ammonia, and consequently its nitrogen is recovered eventually as ammonium sulfate.

The gases are mixed with eight volumes per cent. of air, and are fed to the contact chamber at a temperature of about 140° C. The catalytic process itself is strongly exothermic, and the reaction mixture passes through heat exchangers, where it warms up the raw feed gas, before passing to the absorption system. Process can also be used for production of ammonium salts other than the sulfate.

Leaching Technique As Used in British Tanneries

As a group tannins present some peculiar leaching problems and the technique of their extraction is highly perfected. The tannins are sensitive to air and heat and some are not easily extracted. They are accompanied by considerable amounts of non-tannins. The aim is (1) to obtain the most concentrated liquor possible; (2) to extract the maximum amount of tannin and the minimum amount of non-tannin; (3) to avoid harmful chemical changes. To achieve the most concentrated liquor possible, a counter current principle is adopted and to attain the second and third objects the temperature conditions are carefully adjusted.

Batteries of six or more extractors are employed. One of the simplest leaching plants is the press leach system, common in tanneries. The extractors are rectangular wooden vessels with false bottoms. The bottom of the first extractor connects up with the top of the second, and so on; the bottom of the last extractor connects with the top of the first. Extractor No. I contains the most exhausted materials and the weakest liquor, and extractor No. VI the strongest liquor and freshest material. The strong liquor from No. VI is run out for use or concentration. The weakest liquor in No. I is now pumped on to the liquor in No. II, thereby forcing the liquor in No. II into No. III, etc. Extractor No. I is now emptied and filled with fresh material. Hot water is added to No. II whereby all liquors move forward once more and the whole six extractors are full again. After a suitable interval the process is repeated.

The disadvantages of this simple type of plant are (1) the extractors are open; (2) maintenance of correct temperature is impossible; (3) the downward circulation of the liquors causes blockage; (4) it is difficult to press the liquors through the battery; (5) the system of pressing liquors is inefficient because the liquors mingle; (6) emptying is laborious. Numerous modifications of this simple type of plant are used by extract manufacturers. Thus, a tall, cylindrical extractor made of wood and totally enclosed, being provided with conical false and true bottoms, the latter fitted with a discharging door, may be used. Between the true and false bottoms there may be heating coils. The liquors may be pumped instead of being pressed over. In the Buss extraction plant each diffuser is provided with a pump and calorifier whereby the liquor can be circulated round through the diffuser and heated simultaneously. Certain materials are extracted under pressure in closed copper autoclaves.

Jakimoff has suggested using an interesting physico-chemical principle to diminish the contamination of the colloidal tannins by the less colloidal and crystalloidal non-tannins. The theory of leaching has been discussed by L. M. Whitmore and M. Tottoli—C. H. Spiers, in *Leather Trades Review*, p. 464, Ap. 14, 1937.

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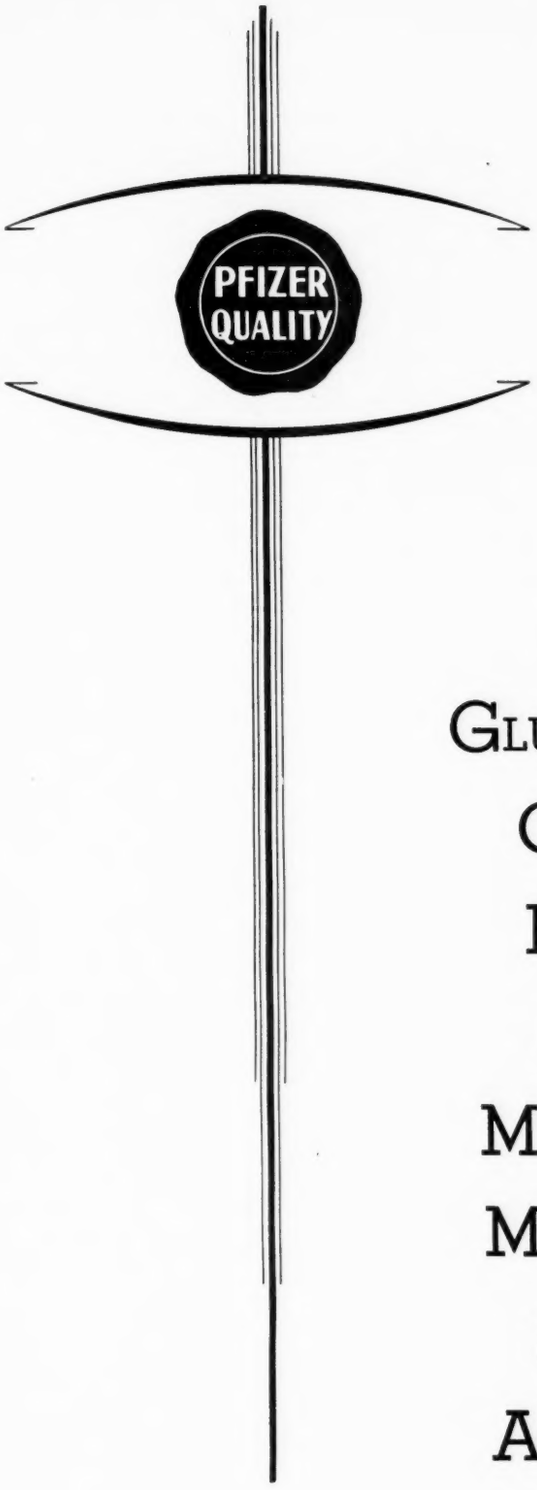

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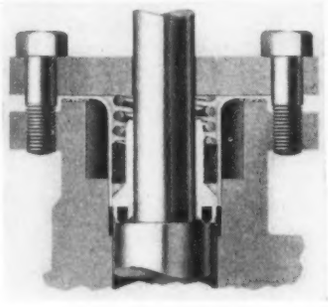
New Equipment

Seal for Rotating Shafts

For eliminating the leakage of gases and liquids around rotating and oscillating shafts of compressors and pumps, a new shaft seal, of unique design, is being manufactured by The Syntron Co., 420 Lexington Ave., Homer City, Pa. Major advantages of the new seal are: entire elimination of leakage over a long period of time without adjustment; self-sealing action; self-lubrication; and a self-centering ring in the sealing head. Its main sealing and wearing surface has an anti-friction and self-lubricating compound insert in bearing metal of the finest quality. The sealing head of bearing metal with its anti-friction insert is held firmly against the shoulder on the rotating shaft to be sealed by strong spring pressure which also expands the packing rings, sealing the bearing head to the housing. It has proven as effective and leak-proof on worn and scored shafts as on new shafts—the soft anti-friction insert quickly seating itself in all inequalities on the surface of the shoulder of the shaft. Quietness of operation by elimination of chattering is assured through the compressed packing rings that grip the seal head-up close to the bearing face. Seal is supplied complete, ready for installation, including the seal nose piece, packing rings, compression spring, seal housing and gasket. Catalog information on request.



Abraser for Testing

A precision testing machine for measuring the wear resistance, toughness, adhesion and rub-off qualities of surface finishes such as enamels, electroplate, anodizing, linoleum, molded plastic sheets and leather coverings is called the Taber Abraser, manufacturer, The Taber Instrument Co. In the research laboratory, the abraser is useful for testing new formulas, control work, checking competitive samples, grading, etc. Its lightness and portability make it possible for traveling sales technicians to prove their claims and to check competitive materials on location.

Transferring Corrosive Liquid

A bulb type pump for drawing acids and other corrosive liquids from carboys and similar containers is being marketed by The Lea Mfg. Co., Waterbury, Conn. The tubing used is glass which is resistant to ammonia and all acids, with the exception of hydrofluoric, and will not contaminate C.P. and reagent grade chemicals. This type of pneumatic pump operates faster than a syphon as it applies proper pressure to the surface of the liquid. Normal capacity is about 2 gals. per min. but higher capacities are obtainable by a more rapid manipulation of the bulb. A release valve can be opened to vent the unused pressure.

Particle Size Analyzer for Fine Powder

Analysis of particle size distribution of fine, dry powdered materials may be accomplished through use of the Roller Particle Size Analyzer introduced by American Instrument Co., Silver Spring, Md. Any number of size fractions may be obtained, with size limits as close as desired, the smallest fraction conveniently secured being 0 to 5 or 0 to 3 microns, depending on the density of the material. Percentage weight of different fractions is duplicable to 0.5%. This analyzer is applicable to most dry powdered materials finer than approximately 200 mesh, and of size greater than colloidal. Among the materials successfully dealt with are cement, gypsum, magnetite, flint, feldspar, diatomite, metal powders, organic dyes, salt, talc, mica, carbon, pigments, China clay, mineral fillers, etc. While a series of fractions may be obtained to give complete distribution, a 0 to 5 micron or a 0 to 3 micron separation in itself furnishes a convenient and rapid check on mill operation and standard of quality.

Soap Distributing System

A system to distribute soap without waste and in uniformly accurate quantities to soaping machines, fulling mills or washers, has been put on the market by Riggs and Lombard, Inc., Lowell, Mass.

Evaporative Condenser for Air Conditioning

The growing demand for air conditioning now creating an acute problem in many cities in connection with water and sewer capacity may be remedied by use of the Carrier Evaporative Condenser, which effects such an economy in the use of water that only one-twentieth as much is used as formerly. The small amount of water consumed is given off as evaporation, therefore does not go into the sewerage systems which are getting badly overloaded by the old type of air conditioning systems. This development of the Carrier Corp., Newark, N. J., operates on the principle of evaporating a small amount of water as it is recirculated over coils used to produce the cooling effect. The old method used in water cooling conditioners consisted of continuously running large quantities of water through the coils, and then directly into sewers.

The evaporative condenser is adaptable for large and small installations and the units can be used in multiple. The overall operating costs for air conditioning are also reduced.

Aluminum Alloy Shin Guard

Ellwood Safety Appliance, Ellwood City, Pa., announce development of an aluminum alloy Shin Guard, which is marketed attached to their Sankey "Improved" Foot Guard, incorporating silent toe piece and quick fastening attachments. This unit affords foot and leg protection against hazards such as found in foundry operations, logging and timber activities, and in manufacturing processes requiring protection of this kind. It permits free foot and leg action on the part of the worker.

Flow Meter Electric Integrator

Bristol's Mechanical and Electrical Flow meters, for measuring the flow of a gas or non-viscous liquid through a closed line, are now equipped with a new electric integrator which totalizes flow once every 15 seconds. A flat disc cam is specially designed to coincide with the flow law, so that it mechanically computes the square root of the differential pressure across an orifice plate or venturi tube constriction in a pipe line, at 15-second intervals. The values obtained are totalized by means of a counter and are indicated on a six-figure integrator dial.

Gas Indicators

UCC Gas Indicators for quickly and easily detecting explosive or irrespirable gas-air mixtures are a new development of Linde Air Products. These instruments are designed to fulfill the requirements of public utilities, gas plants, shipping companies, petroleum companies, paint and lacquer companies, solvent manufacturers, fire departments and insurance companies for locating underground leaks, establishing purge-end points, and determining hazardous conditions in manholes, oil tankers, oil storage tanks, holds of ships, sewers, conduits and tunnels. UCC Gas Indicators are available in three models.

Booklets & Catalogs

Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.

Chemicals

Bancroft Clay, Bulletin, outlines clay mined in New Jersey, widely used as a diluent for various types of insecticidal dusts. United Clay Mines Corp., Trenton, N. J.

Panorama of Lubrication, series booklets giving non-technical information on manufacture and application lubricants; first three so far published are devoted to fundamentals of lubrication, lubricating friction type bearings and Golden Shell. Shell Petroleum Corp., St. Louis, Mo.

Selecting Special Phenolic Materials, article written to better acquaint the average buyer of phenolic moldings with the different types of phenolic materials, by Franklin E. Brill, General Plastics, Inc., No. Tonawanda, N. Y.

Silicate P's & Q's, August, 1937, explains briefly behavior of silicates in industry, particularly their service as cleansers. Philadelphia Quartz Co., 121 S. Third st., Philadelphia, Pa.

The Arbitration Journal, July, 1937, treatises and symposium of international and business interest. Published quarterly by The American Arbitration Ass'n., 8 W. 40th st., N. Y. City.

The Givaudanian, Industrial Aromatics Division, July 1937, contains article of timely interest on "Odor Problems in Air Conditioning." Givaudan-Delawanna, Inc., 80 Fifth ave., New York City.

Equipment, Apparatus

Cast Iron Pulleys for Power Transmission, Book No. 1622, lists prices and pertinent data on solid and split, single and multiple arm-machine-molded pulleys, with and without rubber lagging. Link-Belt Co., 307 N. Michigan ave., Chicago, Ill.

Celeron Molded Plastic Coupling, technical bulletin clearly describes advantages, characteristics, and installation of coupling made from this molded macerated synthetic material. Continental-Diamond Fibre Co., Newark, Del.

Condenser News, new house organ to feature new products for the chemical laboratory. Copies may be obtained by writing Scientific Glass Apparatus Co., Bloomfield, N. J.

Crusher, Pulverizer Feeder, Catalog No. 77, contains 44 pages of engineering diagrams, capacity tables, suggestions for use, etc., and is completely illustrated. C. O. Bartlett Snow & Co., Cleveland, O.

Gas-Fired Furnaces in the Automotive Industries, 16 pp. booklet, features several typical SC installations. Surface Combustion Corp., Toledo, O.

Hard Facing with Haynes Stellite Products, new and complete edition of this booklet, well over 500 money-saving applications of this process. Haynes Stellite Co., 205 East 42d st., New York City.

Hearth-Crete, bulletin explains increased efficiency and reduced maintenance charges obtained by use of this enduring chrome-base castable refractory for monolithic furnace bottoms, burner blocks, water-wall fill and other uses. Quigley Co., 56 W. 45th st., New York City.

H-O-H Lighthouse, August, 1937, interesting item on heating systems considered from the water conditioning standpoint. D. W. Haering & Co., Inc., 3408 W. Monroe st., Chicago, Ill.

Houghton Line, August-September, 1937, features "A Law-Deriding People;" calls attention to line of maintenance cleaners. E. F. Houghton & Co., 240 W. Somerset st., Philadelphia, Pa.

Indicating and Recording Temperature and Pressure Instruments, Catalog 1060C, 56 pp., illustrates, describes and gives specifications and charts. Price list supplements catalog. C. J. Tagliabue Mfg. Co., Park and Nostrand aves., Brooklyn, N. Y.

Industrial Steam Trap, Bulletin 337, six pp. technical data, illustrations and charts of this trap whose value is based fundamentally on the ability to discharge water and air. W. H. Nicholson & Co., 12 Oregon st., Wilkes-Barre, Pa.

Insulcrete, Bulletin No. 320, advantages, uses and properties of this light weight insulating refractory concrete. Quigley Co., 56 W. 45th st., New York City.

Is Your Coal Iron Free? Equipment for eliminating tramp iron from coal to protect stokers and pulverizers. Stearns Mfg. Co., Milwaukee, Wis.

Magnetic Separator Type "AM," details construction and operating characteristics of this specially designed magnetic separator which utilizes AC current for greater pulsating agitation in treatment of fine dry material. Stearns Mfg. Co., Milwaukee, Wis.

Miniature Packing Catalogue, handy reference for engineers, plant operators, and executives, featuring eleven most commonly used U. S. packings; substitute for larger and more comprehensive Catalogue issued by Mechanical Goods Division, U. S. Rubber Products, Inc., 1790 Broadway, New York City.

Molybdenum in Cast Iron, comprehensive book in four sections covering the subject of molybdenum in gray iron; those on malleable and white iron to be published later. Climax Molybdenum Co., 500 5th ave., New York City.

Monel and Nickel in Tanneries, Bulletin C-6, a practical encyclopedia regarding its subject, very clearly presented. International Nickel Co., Inc., 67 Wall st., New York City.

Motors, Bulletin GEA-2594, calls attention particularly to explosion-proof motors used in oil industry and totally enclosed, fan-cooled motors. General Electric Co., Schenectady, N. Y.

Outdoor Switch Houses, Folder GEA-782D, equipment, complete with switching and metering equipment, ready for immediate installation. General Electric Co., Schenectady, N. Y.

Outdoor Air Switches, Type TC, Folder GEA-2023A, operating mechanisms illustrated and characteristic advantages outlined. General Electric Co., Schenectady, N. Y.

Packomatic Carton Folding Machine, Folder 100-28, gives cost estimate, descriptively illustrates operations of machine, and several plant applications. J. L. Ferguson Co., Joliet, Ill.

Production of Castings for Porcelain Enameling, booklet divided into easily understood sections, containing many illustrations showing improper and proper designs of castings. Porcelain Enamel Institute, 612 N. Michigan ave., Chicago, Ill.

Sifters, Folder T.7, gives sizes and specifications of Pascall Sifters, Patent Turbine, which have small screen area but give large output. Pascall Engineering Co., Ltd., 20 Dean st., London, W.1, England.

Solving the Color Problem, booklet includes chart showing 16 basic oxides in actual colors and 32 of the more than 400 colors they produce. Porcelain Enamel & Mfg. Co., Pemco & Eastern aves., Balto., Md.

Stabilog Process Control in Industry, No. 175-1, 32 pp. booklet describes unique system of automatic control of temperature, pressure, level and flow in continuous processes, which takes into consideration rate of change of condition being controlled. Foxboro Co., Foxboro, Mass.

Stackers, Tiering Machines and Portable Elevators, colored folder No. 508—uses and types of this equipment for piling goods and products from floor to ceiling, to provide additional manufacturing and storage space. Lewis-Shepard Co., 175 Walnut st., Watertown, Mass.

Telemetering Bulletin No. 490, typical example of telemetering and remote control using Bristol Metameter; explains how instruments measure, transmit, and record readings over a simple two-wire circuit where transmitter and receiver are any distance apart. Bristol Co., Waterbury, Conn.

Thrustor Operated Valves, CR9507-B3A Double-seat, Balanced Type, CR9507-B3B Single-seat, Unbalanced Type; specification sheet lists classifications, dimensions, and descriptions. General Electric Co., Schenectady, N. Y.

To the Foundry Executive, folder describing magnetic separation equipment for sand reclamation. Stearns Magnetic Mfg. Co., Milwaukee, Wis.

Track-Type Limit Switch, CR9441-LS438 and CR9441-LS442, for diverse applications, specification sheet GEA-1285A, gives outstanding features and illustrations. General Electric Co., Schenectady, N. Y.

Turbine Pumps, Bulletin 260-B11C places special emphasis on wide application in industrial field; shows various installations and types of drives to which pumps are adaptable. Roots-Connersville Blower Corp., Connersville, Ind.

Turbine Wet Mixer, for high speed, standard sizes and specifications given in Leaflet T. 8. Pascall Engineering Co., Ltd., 20 Dean st., London, W. 1, England.

Verigraph Moisture Controller for Control of Paper Drying, Bulletin No. 212, 20 pp. said to be only instrument that directly measures moisture of paper on machine, method of operation, problems arising in this connection as well as engineering data are included. Pulp & Paper Division, Foxboro Co., Foxboro, Mass.

Water Works Manual, 120 pp. practicable data about Youngstown special wrapped and lined steel water mains, also technical information. Water Works Division, Youngstown Sheet & Tube Co., Youngstown, O.

Equipment News

Eades Completes Tour of Europe

J. A. Eades, secretary, Read Machinery Co., York, Pa., manufacturers of bakery and chemical equipment, has just returned from a six weeks business and pleasure trip in Europe. While in Germany he attended the Chemical Engineering Equipment Exposition at Frankfort.

New Distributors Announced

Republic Steel's vice president in charge of sales, N. J. Clarke, announces four new distributors for the company's complete range of tubular products: Bluefield Supply Co., Bluefield, W. Va.; Ormand Plumbing Supply, San Antonio, Texas; J. Gaber Co., Houston, Texas, and Morgan's Inc., Savannah, Ga.

Installations of Dust Collectors

Recent installations of Norblo Dust Collectors by Northern Blower Co., Cleveland, O., include: Phelps Dodge Corp., New York City, their subsidiary, Nichols Copper Co., at Laurel Hill, N. Y., and McGean Chemical Co., Cleveland.

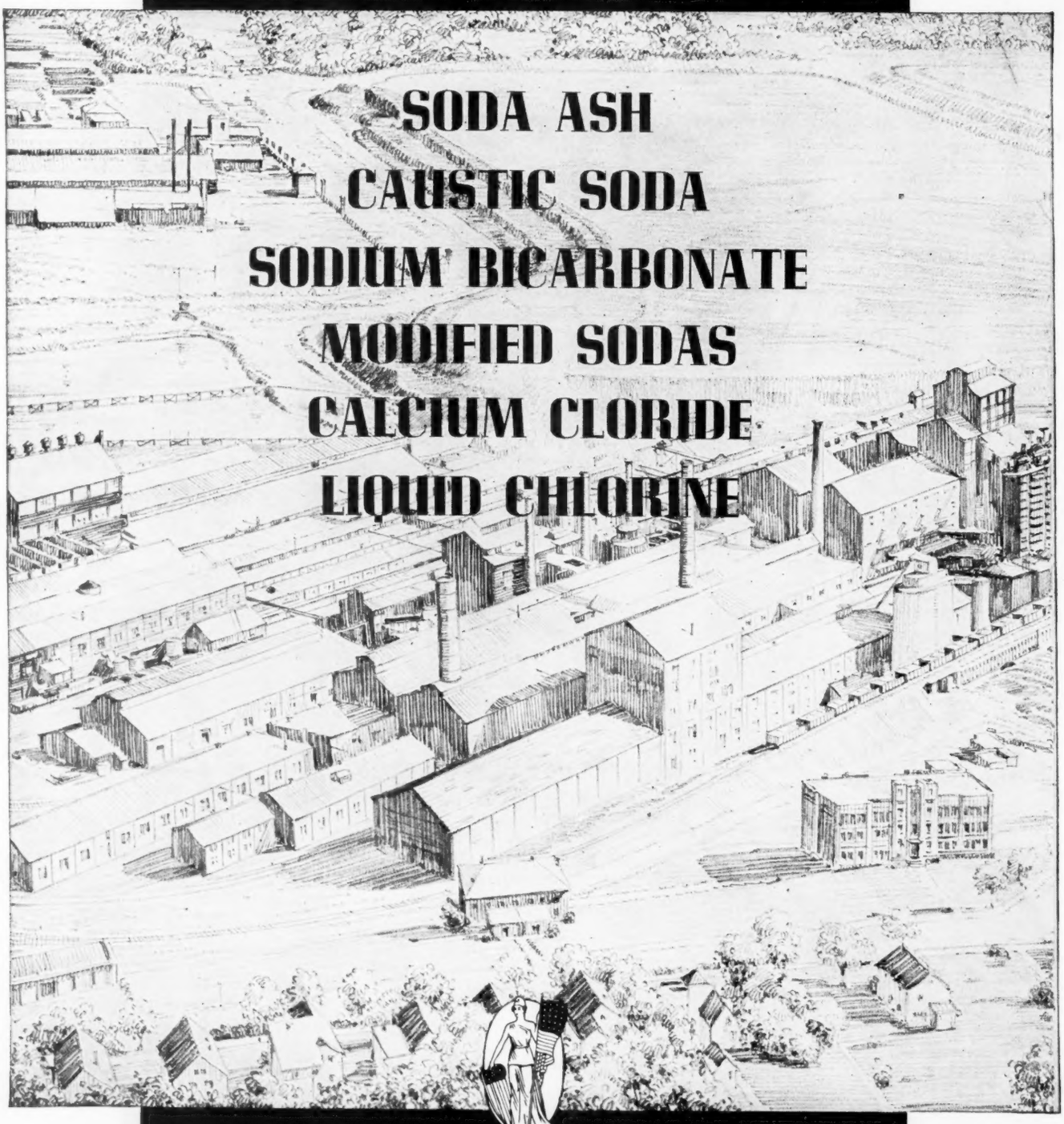
Disposes of Dust Collecting Division

Blaw-Knox announces the sale of its dust collecting division to Pangborn Corp., Hagerstown, Md. Patents, drawings and good will of the division are also taken over by Pangborn. Blaw-Knox will continue to manufacture and market Blaw-Knox devices for the cleaning of liquids and gases, this type of equipment not being included in the above arrangement.

Boe Commercial Manager Westinghouse

Appointment of H. F. Boe as commercial manager is announced by Westinghouse Electric Manufacturing. Mr. Boe will have two headquarters, one in the Union Bank Building at Pittsburgh, the other at 150 Broadway, New York. In addition to being responsible for the sale of Westinghouse products in the Eastern District, Mr. Boe will now direct the commercial activities of the apparatus divisions.

COLUMBIA



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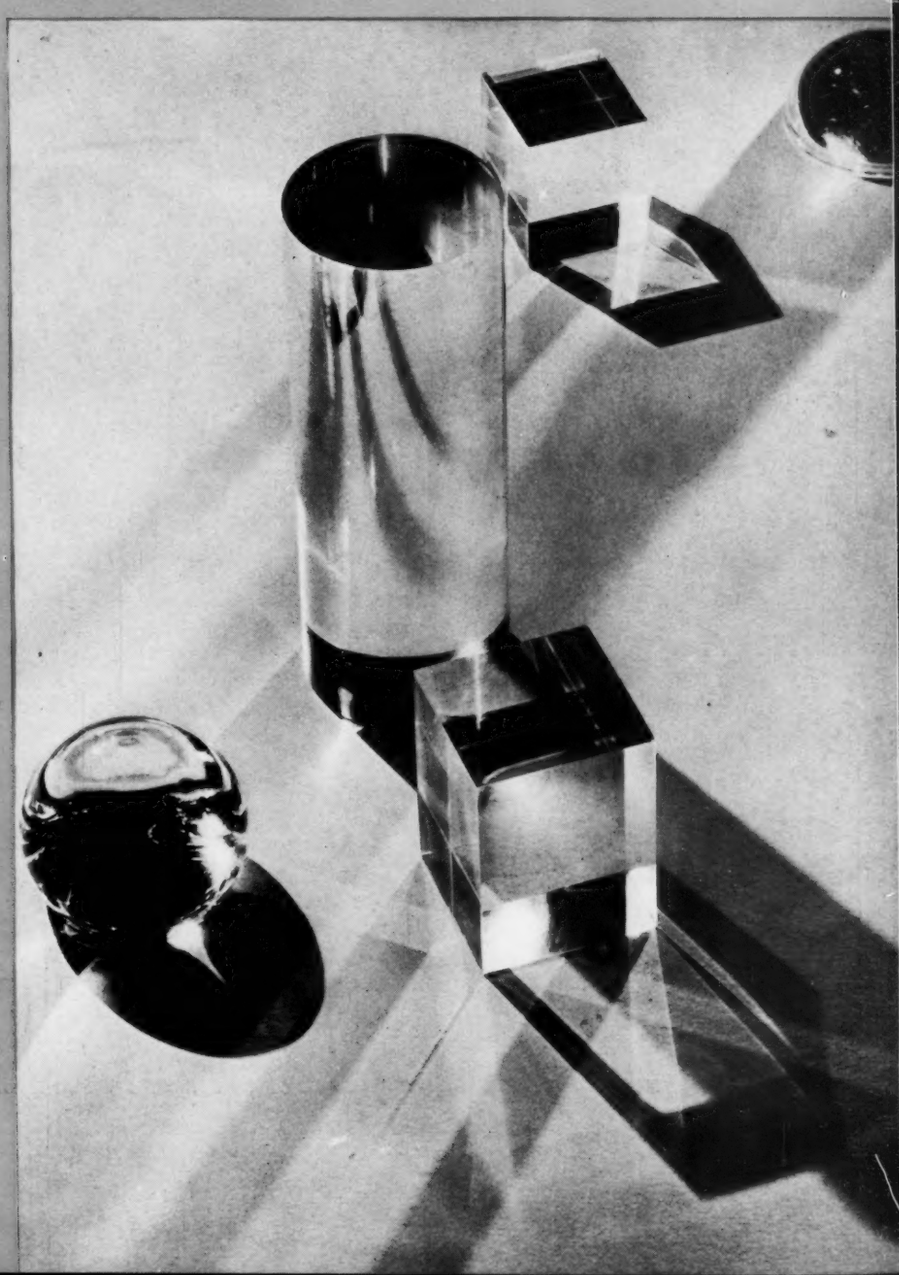
A Digest of Chemical Uses and U.S. Patents



Dow enters the plastics field with Styrene

First Aid to INDUSTRY'S EXPLORERS

The research chemist travels a difficult trail. From a given starting point, intricate paths branch off in many directions—and selection of the most direct course in developing a new process or product frequently depends upon the basic reagent used in formulation and synthesis.

Sharples Amyl Compounds have proven valuable "first aids" in scores of diversified process industries. One of the Amyl compounds may be just what you have been seeking to shorten some essential step, improve quality, or eliminate waste of costly materials. Our laboratory facilities are at your disposal in helping you select the proper Amyl compound to produce the results you seek.

Samples of any Sharples product will be forwarded promptly on request.

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Methyl Propyl Carbinol
Diamyl Sulphide
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Amyl Mercaptan
Diethyl Carbinol
Dichloro Pentanes
Diamylene
Iso-Butyl Carbinol
Secondary Butyl Carbinol
Mixed Amyl Chlorides
Amyl Benzene
Diamyl Ether
Normal Amyl Chloride
Normal Butyl Carbinol
Monoamylamine

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SHARPLES SOLVENTS

THE SHARPLES SOLVENTS CORP., 23rd and Westmoreland Sts., Philadelphia, Pennsylvania

Phosphatides as Commercial Products

By Dr. B. Rewald

THE phosphatides are bodies which contain organically combined phosphorus, are of a fat-like nature—therefore saponifiable—and are soluble in most organic solvents such as ether, light petroleum spirit, and benzene, but insoluble in acetone and ethyl acetate. They can be divided into a number of sub-groups, of which two only, the lecithins and the cephalins, have at present technical importance. By "lecithins" are understood those phosphatides which are completely soluble in alcohol and contain a choline group, while the cephalins are insoluble in alcohol and contain a cholamine group.

The phosphatides are present in all naturally occurring organic substances, particularly in those cases where the substance is the reserve foodstuff for, or the germination centre of, the next generation in the animal or plant. Eggs, especially the eggs of birds, are rich sources of the phosphatides, usually the lecithins. The lecithins occur in the egg yolk, and the white is practically free from phosphatides. Dried egg yolk contains about 10 per cent. lecithin, and in practice Chinese egg yolk, which is imported in the dried state, is used almost exclusively for egg-lecithin manufacture. For a really first-class product, either the fresh egg yolk or material that has been carefully dried in vacuo should be used. A good method and one often employed for the isolation of the lecithin is the following:

The dried egg yolk is first treated in the cold with ethyl acetate which dissolves the accompanying egg oil, but which has only very slight solvent action on the actual lecithin. After thorough extraction, there remains a white powder which contains up to 30 per cent. lecithin. The residual solvent is removed as far as possible in vacuo and the residue further extracted with high percentage alcohol, pure methyl alcohol being most suitable. The alcohol dissolves the lecithin, and after removal of the solvent by distillation and drying of the residue in vacuo, there remains a pale yellow material of honey-like consistency which after some time at ordinary temperatures becomes pasty. At this stage the lecithin still contains certain impurities, from which it can be freed by repeated solution in benzine and precipitation by acetone. A practically 100 per cent. material containing the theoretical quantities of nitrogen and of phosphorus can be obtained. The material has an agreeable nut-like taste.

Still purer products can be obtained by starting with freshly-separated egg yolk, which is treated directly in the cold with acetone. As acetone has the capacity of absorbing water, by working with ample quantities of the solvent the preliminary drying of the yolk is unnecessary.

These very pure products have, however, the great disadvantage of very rapid discoloration, turning dark brown and sometimes almost black, they also acquire a disagreeable taste and smell. In addition, they are very hygroscopic, and must be stored in dark-colored containers in vacuo or in an atmosphere of carbon dioxide. Even so, it is impossible completely to avoid decomposition, and many of the commercial egg lecithins are products which have undergone a greater or lesser degree of decomposition.

The production cost of egg lecithin is inevitably always high, even when the raw material is imported Chinese eggs. The oil obtained as by-product is practically valueless, and the same is true for the other residues of the process. On these grounds egg lecithin has found, and still finds, its principal application for pharmaceutical purposes.

A further raw material for phosphatides is animal brain tissue, commercially the material produced in large abattoirs of the Argentina and elsewhere. The isolation process is simpler than in the case of egg yolk, since the brain tissue contains no neutral fat, but the material extracted (cephalin type) is a hard, brittle mass which has poor solubility properties and which consequently has made little headway as a technical material.

The third, and far the most important, source of the commercial phosphatides, is provided by the vegetable kingdom, and here the soya bean is the outstandingly predominant source. Compared with the other important oilseeds, the soya bean has a low content of oil—17 to 18 per cent.—but its high protein content has given it great significance as a source of foodstuffs for both men and cattle. At first the expression technology, as applied to linseed, was used for the soya bean, but it was soon realized that by this method only half of the oil content of the bean could be recovered, and the industry has gradually turned to the solvent-extraction method with its almost quantitative recovery of the oil values.

It was early found, however, that the solvent-extracted oil contained much mucilaginous material which demanded long storage of the oil for its satisfactory separation. Today this mucilaginous material is recognized as the richest and most convenient source of the lecithin of commerce. With the progress of the industry, methods have been found whereby the separation of the mucilage from the clear oil can be accelerated; most of these methods being dependent upon centrifuging in special machines, the various modifications being covered by a large number of patents in many countries.

These plant phosphatides, after they have been freed from their accompanying water by drying in high vacuo, are yellow to brown pasty masses with physical and solubility properties intermediate between those of egg lecithin and brain cephalin. They seem to be a mixture of the two materials with the cephalin predominating. Despite this latter fact, however, they are not hard and dry, but as soft as egg lecithin and are easy to apply for technical purposes.

The soya bean contains about 2 per cent. phosphatides, and of this quantity only some 25 per cent. is recovered in practice. This is the so-called "free phosphatide," the material which is combined or firmly associated physically with the protein, escaping isolation owing to its insolubility. Despite the poorness of the yield, the vast quantities of soya beans annually worked up into oil mean the recovery of important tonnages of phosphatide, and no other plant product seems at the moment capable of offering effective competition to the soya bean.

Influence of the Retained Oil Content

The soya bean phosphatide is usually referred to as "lecithin," and possesses properties which make it especially suitable for technical application. Unlike pure egg lecithin, it is remarkably stable on storage, and the reason for this has been found to lie in the oil which it always contains. It has been found that the soya bean lecithin invariably consists of a mixture of about 60—65 per cent. of phosphatide and about 30—25 per cent. oil. If the initial product is richer in oil than the above mixture, the excess of oil separates out on the surface. The presence of this oil seems to confer on the material resistance to rancidification and other changes over weeks, and even years, of open exposure to the air. Knowledge of the mechanism of this protective action is at present inadequate to allow of the formulation of a satisfactory theory.

Recent research has shown that the soya bean phosphatide is far more than a simple mixture of lecithin and oil: it always contains considerable quantities (2 to 10 per cent.) carbohydrates (sugars). These sugars seem to be present in all the phosphatides derived from the vegetable world. The sterins are also present, but these are probably derived from the oil. The sterin of the soya product is particularly rich in stigmasterin, the parent substance of the sexual hormones.

Chemically, the phosphatides occupy a position midway between the fatty oils and the proteins, and to this fact is largely due their range of technical application. They resemble the fatty oils in their capacity for undergoing hydrolysis into glycerine and the fatty acids, though they contain two and not three fatty acid groups per molecule. They resemble the proteins in their possession of an amido group and in their general physical properties.

Lecithin in Rubber and Leather Manufacture

For many industrial purposes, also, the phosphatides possess high utility, although discussion of this aspect must be brief. One of the largest users is the rubber industry, where the lecithin serves as a medium for facilitating the incorporation with the rubber of such difficultly miscible materials as carbon black and zinc oxide. Another important using industry is the manufacture of leather, where lecithin has established its place in face of the competition of the widely used sulfonated oils. Liquors prepared with lecithin possess exceptionally good penetrating properties, and do not lead to superfatting. The leathers produced have an attractive handle and the desired degree of softness. The textile industries, also, now make widening use of lecithin in the spinning and weaving processes.

The statement has often been made in the literature that the fishy odor occasionally encountered in butter or margarine is due to the decomposition of the natural or added phosphatide content. Preliminary experiments conducted by the writer do not bear out this contention, but demonstrate what a remarkably stable product commercial lecithin is. Aqueous solutions of lecithin have been found resistant to the action of such materials as hydrogen peroxide, even in the additional presence of lactic acid, no fishy odor being developed after months of contact.

From paper presented to Fifth International Technical and Chemical Congress of the Agricultural Industries.

Miscellaneous

New Use for Acetylene

At the University of Hawaii discovery has been made that a mixture of acetylene with air or a saturated solution of acetylene in water will stimulate the pineapple plant to root at unexpected places and will also cause the plant to put out flower-producing processes instead of foliage. Plants can be induced to flower a year earlier than normal by this treatment but size of resulting fruit depends on size of the plant. Many other plants respond in much the same way. *Food Industries.*

Bentonite as Water Filter

A cheap, new way to purify and filter water with bentonite has been revealed by Prof. H. L. Olin, University of Iowa. No filter beds are needed and only 125 parts of bentonite to a million of dirty river water are necessary to cleanse it.

New Organic Glass

A shatterproof glass with an organic base (polymerized methyl ester) is a German development. It will harden into bubble-free, transparent glass in any desired thickness up to 2", and is impervious to water and acids, although some organic compounds will dissolve it. Tests show the glass can stand 8 to 10 times the blows of silicate glass before breaking. It is said to be very satisfactory for use in airplanes and automobiles, as well as for optical purposes.—*Ceramic Age,* Aug. '37, p. 109.

Vulcanization of Rubber

Metallic oxide vulcanization of rubber, described by Spence and Ferry (*J.S.C.I.,* 137, *56,* 246-9T), is produced by heating latex, from which the diffusible serum constituents have been removed, with potassium ferricyanide in absence of air. The ferricyanide is reduced to ferrocyanide and a similar effect may be obtained by certain other metallic oxidizing agents in the absence of air.

Rubber Lubricant

Lubrex is a lubricator for molds, when vulcanizing, and for uncured stock when being handled. Without building up a detrimental film in the mold, it prevents sticking of the stock to the mold and allows the mold plates to separate easily when the product is being removed. According to the manufacturer, Standard Chemical Co., Akron, O., light colored articles are not discolored by its use, but the products take on a gloss which has very much the same effect as is produced by a varnish. Lubrex does not undergo any chemical action during the cure and therefore does not affect the rate of vulcanization. It is said to be effective in preventing adhesion of warm stock as it comes from the mill or tubing machine. A two per cent. solution in water is recommended for use on molds or press platens and three per cent. when applied to unvulcanized stocks.

Rubber Compound

Onazote, a rubber compound which has been expanded and vulcanized so as to form into countless self-contained cells, has been developed by Expanded Rubber Company, Ltd., Croyden, England. In finished form it presents a tough, smooth surface, which may be punctured without deflecting from the material's buoyancy. It can be supplied in forms with a weight less than one-half that of cork. Tests of lifebuoys made of this new material are said to have passed all Board of Trade specification tests by a wide margin. Its water absorption is negligible, and it has also been found suitable as insulation board.

Industrial Applications Neoprene

Future possible industrial applications of Neoprene are quoted by R. B. Clarke, p. 285, July '37, *Journal Society Dyers & Colourists,* as: a covering for drag rollers in the textile industry; to replace glue-gelatin compositions for printers' rollers because it withstands rough handling and the effect of oils. Neoprene compounds, *e.g.,* flexible ebonite, could be bonded to metal, and its use is foreseen in the chemical industry as a lining for road and rail tanks for safer chemical transport.

Fireproofed Leather

Use of aluminum sulfate and sodium phosphate to fireproof leather, which has been completely tanned with vegetable products and freed from natural grease or oil used in its manufacture, is mentioned in E. P. 465,533. Following is example given: The prepared leather is placed in an ordinary tanner's drum together with an amount of water equivalent to its own weight, preferably at a temperature of 50° C. Five pounds of aluminum sulfate previously dissolved are added to 100 lb. of leather, and drumming prolonged for a period of sixty minutes. At the end of this time, five pounds of sodium phosphate are added and the drumming continued for a period of sixty minutes, when the leather may be removed and washed preliminary to drying. Reference is made to E. P. 10,482 of 1888.

New Use for Copper Resinate

Manila rope, when submerged under water for 10½ months, retains only about 13 per cent. of its original strength. If treated correctly, over 70 per cent. of the strength can be retained. One highly effective agent for this purpose is a ten per cent. solution of copper resinate in creosote oil. *Chemical Trade Journal,* Aug. 6, '37, p. 115.

HALT!

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FROM raw materials to finished product, Victor products travel a closely guarded route. As each strategic point in the process of manufacture is reached, samples are withdrawn for inspection and approval by the control laboratory. Only when such samples conform with exacting standards is the password to proceed given. Only by such tireless supervision of intermediate steps can the quality, purity and uniformity of the Victor end-product be assured. It is by such methods that the Victor Chemical Works in the brief space of three decades has become the world's largest producers of food grade phosphoric acid and its salts.

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Gelatin or glue of improved color and clarity is obtained by treating a solution thereof at an elevated temperature, *e.g.*, between 60° C. and the boiling point of the solution, with a quantity of a water-soluble aluminate sufficient to bring the pH value of solution to at least 8.5, but preferably not above 10. Precipitate formed may be filtered off.—E. P. 463,432.

Schweinfurt Green Process

New Schweinfurt green process patented by Dr. Stefan Balint, of Budapest, is described in *Vegyi Ipar*. It uses solid arsenic trioxide which is slowly stirred into a hot solution of copper acetate. The arsenic oxide dissolves immediately and the Schweinfurt green separates completely on cooling.

Manganese Sulfate Speeds Fruit Formation

Experiments by U. S. Dept. Agriculture on addition of small quantities of manganese sulfate to the soil have resulted in oranges that mature two to three weeks earlier and yield a sweeter, richer-colored juice. This element has definitely helped the trees to overcome a nutritional disorder known as chlorosis.

Shark Oil as Airplane Lubricant

A Japanese invention claims use of shark oil as a lubricant in airplanes. Commerce Dept. has been advised that the oil could be used in motors at temperatures as low as 45 degrees below zero.

New Uses for Coated Paper

Suggested new uses for Koroseal coated paper, development of B. F. Goodrich Co., are: protection for exposed surfaces of fine furniture as well as machinery which have been attacked by salt air in ocean transit; also as an acidproof, waterproof disposable lining bag for garbage cans. Paper is acid, oil, air, and light resistant.

Papers for Cheques

Zellstoff und Papier reports two recent patents for cheques, letters of credit, etc. Specthausen specifies the addition of iron in fine powder to the pulp. Any chemical used in tampering with the writing on this paper will cause marked coloration. In the Russel patent a heavy metal is also specified. This may be iron, copper or tin, but an oxide of a metal is also added in fine powder or in colloidal suspension. For instance, the addition to the pulp in the beater is 2.5 per cent. iron and 2.5 per cent. copper oxide, together with an alkaline binding agent. Any attempt to tamper with writing on this paper has the same effect of coloring the touched spots.

Impermeable Paper

An impermeable paper is obtained by waxing with a mixture of paraffin and a titanium pigment, according to patent issued to Societe Industrielle du Titane. In order to suspend pigment in melted paraffin, a dispersion agent (lanolin, vaseline, or chlorestine) is added. *Le Papier.*

Catalysts in Pulp Bleaching

Experiments by P. S. Larin and M. W. Nagorsky reported in *Zellstoff und Papier*, on the influence of sesquioxide of iron and dioxide of manganese in bleaching cellulose showed that the addition of black oxide of manganese accelerated bleaching, reducing the time by half. Reaction is purely catalytic; the black oxide can be used indefinitely. Sesquioxide of iron is less active. The drawback is that catalysts modify to a greater or less degree the chemical characteristics of cellulose. Also the content of alpha-cellulose in the pulp was somewhat less when a catalyst had been used. It is possible that the advantage in time gained and the saving of chlorine off-set these drawbacks.

New Rock Deposit

Wonderstone is the name assigned to a deposit of stone with peculiar properties now being worked in the Lichtenburg district of the Transvaal, and discussed in a bulletin recently issued by the Geological Survey Division of So. Africa. It is described as a bluish-grey, slatey looking rock which, unlike ordinary slate, has no tendency to cleave into or split off in thin flakes or plates, and seems to be a metamorphosed clay. It appears to be suitable for electrical purposes.—*Chemical Trade Journal*, Aug. 6, '37, p. 118.

Radio Cabinet Molding Material

Durez 113 Black molding material is useful for radio cabinets and other large housings where appearance is important. General Plastics, Inc., No. Tonawanda, N. Y., manufacturer, claims features of new material are: deep rich black color obtained; long draws possible; smooth lustre; and hard buffing permitted without danger of showing filler-spots.

Substitute for Olive Oil

Textile technologists, keenly aware of the rising prices of olive oil, one of their necessary materials, are seeking a satisfactory substitute in a synthetic oil. The success achieved toward this end is revealed in an article, "Is There an Efficient Substitute for Olive Oil?" by P. H. Anderson, *Textile Colorist*, p. 444.

Synthetic Peppermint

Development of a process for production of synthetic peppermint, using chlorine, is reported by the Industrial Research Institute of Tokyo, Japan.

Zinc Sulfate Controls Pecan Rosette

Pecan rosette may be controlled by use of zinc sulfate, according to U. S. Bureau of Plant Industry. It may be applied by spraying on trees in summer; applying directly on trees in summer; and inserting in tree trunks in early spring.

New Elastic Leather

A new elastic leather with sufficient "give" to preclude pinching or cutting is being made through chemical process not yet revealed. Process restores tanned leather to its original elasticity which is made permanent by a thin backing of fabric made with elastic yarn.

Month's New Dyes

General Dyestuff offers: Benzoform Yellow RL, a new direct dyestuff for after-treatment with formaldehyde, which discharges to an excellent white with neutral and alkaline gums. Alizarine Cyanine Green GWA, product of I.G. offered by General Dyestuff, is superior in fastness to washing and milling to the old Cyanine Green brands; also has better affinity from a neutral bath. It has good affinity for silk, and in wool-silk mixed fabrics gives both fibers about the same depth. Celliton Discharge Blue 5G is a bright blue dyestuff for acetate silk which is dischargeable to a pure white. It can be used as a combination dyestuff for dischargeable brown and black shades. Diazo Fast Bordeaux BBLA, which, when diazotized and developed with Developer A, produces on cotton and rayon full shades of a bright bluish red which can easily be discharged to a very clear white. Direct Fast Orange MR Conc., of G. A. W. manufacture, a direct color which produces on cotton and rayon bright orange shades possessing good fastness to light and washing. Particularly recommended as a speck dyeing color as it leaves wool practically clear.

An important recent addition to the I. C. I. range is Scarlet Chrome 20,225, an inorganic pigment especially designed for printing inks. Its great opacity makes it particularly valuable for preparation of inks for printing on colored papers and for transparent material such as viscose films. Other uses are in the manufacture of paint and linoleum, and in coloring nitrocellulose lacquers.

U. S. Chemical Patents

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Manufacture calcium phosphate fertilizer. No. 2,086,565. Walter H. MacIntire, Knoxville, Tenn.

Cellulose

Hydrolysis of cellulose. No. 2,086,701. Henry Dreyfus, London, England.

Apparatus for saccharification of cellulose. No. 2,086,963. Heinrich Scholler, Solln, near Munich, Germany.

Manufacture non-fibrous, cellulosic pellicle, obtained by coagulation of an aqueous cellulosic dispersion containing ethylene glycol. No. 2,087,008. James E. Snyder, Kenmore, N. Y., to du Pont, Wilmington, Del.

Precipitation a cellulose derivative from its solution in an organic solvent. No. 2,087,019. Louis Etienne Clement, Meudon-Val-Fleury, France, to Eastman Kodak Co., Jersey City, N. J.

Continuous esterification of cellulose; passing sheet of cellulose through esterification bath containing an aliphatic ether. No. 2,087,036. Carl J. Malm and Chas. L. Fletcher, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Cellulose pulping system and product thereof. No. 2,087,263. Fredrick Olsen, East Alton, Ill., to Cellulose Research Corp., corp. of Del.

Production cellulose ethers; treating cellulose with an etherifying agent in presence of an aqueous solution of a quaternary ammonium hydroxide. No. 2,087,549. Donald H. Powers, Moorestown, N. J., and Louis H. Bock and Alva L. Houk, Bristol, Pa., to Rohm & Haas Co., Phila., Pa.

Flexible abrasive article comprising a composite backing consisting of a hydrated cellulose sheet, a fabric sheet adhesively attached to one face of sheet, and a heat-hardened resin filling interstices of sheet. No. 2,087,318. Carl W. Foss to Carborundum Co., both of Niagara Falls, N. Y.

Manufacture transparent sheet material; first treating copper-oxide-filled cellulose fiber sheet with ammoniated water to form in situ throughout sheet a cuprammonium solution to convert cellulose fiber into cuprammonium cellulose gel. No. 2,087,609. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Apparatus for saccharification of cellulose. No. 2,088,977. Heinrich Scholler and Rudolf Eickemeyer, Solln, near Munich, Germany.

Coal Tar Chemicals

Recovery phenols from aqueous solutions. No. 2,086,856. Wilhelm Deiters, Paul Herold, Paul Koppe, and Fritz Luttge, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Production acyl substitution products of phenols, condensing a carboxylic acid with a phenol in presence of a heteropolyacid. No. 2,087,213. Siegfried Skraup, Wurzburg, Germany, to Schering-Kahlbaum A. G., Berlin, Germany.

Method mixing natural gas with coke-oven gas. No. 2,087,681. Chas. F. Bleyer, Lorain, O., to National Tube Co., corp. of N. J.

Manufacture 2.4-dinitro-3.6-dihalogenanilines. No. 2,087,689. Oskar Knecht and Otto Charles Billeter to Chemical Works, formerly Sandoz, both of Basel, Switzerland.

Preparation aromatic acid amides containing the trichloromethyl group. No. 2,087,715. Arthur Wolfram, Frankfort-am-Main, and Emil Hausdorfer, Hofheim-am-Taunus, Germany, to General Aniline Works, Inc., New York City.

Preparation 4-alkyl halo-phenols. No. 2,087,986. Lindley E. Mills to Dow Chemical Co., both of Midland, Mich.

Production condensation products from aromatic amines and formaldehyde. No. 2,088,143. Theodor Sutter to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Conversion carbonaceous materials containing sulfur to form lower boiling hydrocarbon oils. No. 2,088,214. Theodor Wilhelm Pfirrmann, Castrop-Rauxel, Germany, to Friedrich Uhde Ingenieur-Buro, Dortmund, Germany.

Vertical retort for carbonization of coal, etc. No. 2,088,252. Fred. Jos. West and Ernest West, Miles Platting, Manchester, England, to West's Gas Improvement Co., Ltd., Manchester, England.

Catalytically dehydrogenating hydrogenated polycyclic phenols. No. 2,088,425. Wilbur A. Lazier, New Castle County, Del., to du Pont, Wilmington, Del.

Process separately removing ammonia and phenol from liquor containing ammonia in free and fixed form. No. 2,088,817. Mark Shoeld, Balto., Md., to Koppers Co., corp. of Del.

Preparation naphthalene polycarboxylic acid arylides. No. 2,088,829. Max Wyler and Arnold Kershaw, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Manufacture 2,4-dimethyl-3-or-5-nitrobenzylchloride. No. 2,088,912. Hans Lange and Otto Hoffmann, Dessau in Anhalt, Germany, to General Aniline Works, Inc., New York City.

Method for varying solubility of cellulose acetate. No. 2,089,201. Georg Frank, Berlin, Germany, to Hercules Powder Co., Wilmington, Del.

Composition for treating coal, comprising a chloride, which upon heating decomposes below the fusion temperature of iron sulfide, together with manganese dioxide, and a substance containing chromium oxide. No. 2,089,599. Lawrence P. Crecelius, Shaker Heights, O.

Preparation cyclic ammonium salts. No. 2,089,602. Chas. Granacher to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Carbonizing retort for use in coke and gas producing chamber ovens. No. 2,089,628. Carl Still, Recklinghausen, Germany.

Patents digested include issues of the "Patent Gazette," July 13 through August 10 inclusive.

Coatings

Spraying device. No. 2,086,987. Edw. O. Norris, Port Chester, N. Y., to Norris Painting Machinery Corp., Inc., New York City.

Metallic finish; comprising China-wood oil-linseed oil modified polyhydric alcohol-polybasic acid resin, thinner, and a drier. No. 2,087,094. John Dorman McBurney, Newburgh, N. Y., and Edgar Hugo Nollau, Wilmington, Del., to du Pont, Wilmington, Del.

Method of producing pigment coating composition and process of reducing viscosity in certain paint or like systems. No. 2,087,197. Samuel Cabot, Jamaica Plain, Mass., to Samuel Cabot, Inc., Boston, Mass.

Liquid coating composition containing a vehicle consisting of a natural petroleum extract having an average molecular weight above approx. 200, said extract characterized by properties of solvent-load carrying-power, fluidity when loaded, penetrating and drying power. No. 2,087,395. Augustus H. Batchelder, Berkeley, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

Coating composition comprising solution of a member of the group of polymerized lower esters and nitrile of α-methacrylic acid. No. 2,087,469. Wm. Chalmers, Vancouver, B. C., Canada, to Rohm & Haas Co., Phila., Pa.

Method and apparatus for coating objects with lacquer base film. No. 2,087,504. Edw. Davis, San Leandro, Calif., to Willard E. Johnson, Dava Burkholder, and Guy E. Drake, Oakland, Calif.

Preparation air-drying urea-formaldehyde coating composition. No. 2,088,036. Sydney Leonard Morgan Saunders, London, England.

Coating composition, a dry film of which remains free from chalking and bronzing under prolonged exposure to atmospheric conditions; comprising a cellulose derivative, a resin, a pigment, a plasticizer, and a volatile solvent. No. 2,088,052. Geo. R. Ensminger, New Brunswick, N. J., to du Pont, Wilmington, Del.

Apparatus and method of affixing material having a normally dry water-soluble or water-sensitive adhesive surface to surface of an object composed of synthetic resins or to a surface which is smooth or highly polished. No. 2,088,405. Leo Cahn, Woodside, N. Y., to Consolidated Decalcomania Corp., Brooklyn, N. Y.

Solution adapted for production of bright zinc; containing chromic acid, nitric acid, and a compound containing a sulfate radical. No. 2,088,429. Walter R. Meyer, Milford, and Michael F. Dunleavey, Bridgeport, Conn., to General Electric Co., Schenectady, N. Y.

Automatic coating machine. No. 2,088,542. Chas. J. Westin to F. J. Stokes Machine Co., both of Phila., Pa.

Coating composition for stencil sheets, etc., comprising a cellulose ester and a higher molecular alcohol. No. 2,088,764. Otto Schenck, Dessau-Anhalt, and Kurt Stickdorn, Rosslau-Anhalt, Germany.

Coating for arc welding electrodes. No 2,089,101. Albert Roux, Enghien, France, to l'Air Liquide Societe, Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France.

Machine for coating frangible web material with a thermoplastic coating composition. No. 2,089,524. Allen Abrams and Charley L. Wagner, Wausau, Wis., to Marathon Paper Mills Co., Rothschild, Wis.

Machine for coating frangible web material with a thermoplastic coating composition. No. 2,089,525. Allen Abrams, Geo. W. Forcey, and Robt. A. Farrell, Wausau, Wis., to Marathon Paper Mills Co., Rothschild, Wis.

Dyes, Stains, etc.

Preparation vat dye powder, comprising a vat dye and an anhydrous alkali metal acetate. No. 2,086,574. Earl L. Pelton to Dow Chemical Co., both of Midland, Mich.

Preparation carbocyanine dyes. No. 2,086,689. Walter Zeh, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production anthraquinone vat dye powders. No. 2,086,831. Walter S. Tolman, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Production metallized acid azo dyes. No. 2,086,854. Moses Leverock Crossley, Plainfield, and Lincoln Maurice Shafer, Highland Park, N. J., to Calco Chemical Co., Inc., Bound Brook, N. J.

Preparation dyestuffs of the dioxazine series. No. 2,086,871. Georg Kranzlein, Karl Thiess, Heinrich Greune, and Arnold Brunner, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production polyazo dyestuffs. No. 2,086,880. Hans Schindhelm and Carltheo Schultis, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Production dyestuffs of the naphthalene-1.4.5.8-tetracarboxylic acid dimide series. No. 2,087,133. Heinrich Vollmann, Frankfort-am-Main-Unterliederbach, Germany, to General Aniline Works, Inc., New York City.

Production oil soluble azo dyes. No. 2,087,282. Martin E. P. Friedrich, Carneys Point, and Francis H. Smith, Woodstown, N. J., to du Pont, Wilmington, Del.

Production monoazo dyestuffs. No. 2,087,425. Otto Bayer and Detlef Delfs, Leverkusen-am-Rhine, Richard Fleischhauer, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Production dyestuffs of the anthraquinone series. No. 2,087,438. Georg Kranzlein, Ernst Diefenbach, and Fritz Eggert, Frankfort-am-Main, and Georg Rosch, Cologne-Mulheim, Germany, to General Aniline Works, Inc., New York City.

Production azo dyes. No. 2,087,706. Wilfred Archibald Sexton, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Readily dispersible vat dyestuff preparation, adapted for use in printing gum formulas containing high-alkali-metal carbonate content. No. 2,087,866. Henry J. Weiland, Wilmington, Del., and Otto Stallmann, So. Milwaukee, Wis., to du Pont, Wilmington, Del.

Preparation azo dyestuffs. No. 2,088,327. Arthur Howard Knight, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Production monoazo dyes. No. 2,088,328. Walter Leister, Wolfen, Kreis Bitterfeld, Germany, to General Aniline Works, Inc., New York City.

Manufacture azo dyes. No. 2,088,333. Mordecai Mendoza, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Production complex metal compounds of azo dyestuffs. No. 2,088,353. Guido von Rosenberg, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Dyeing apparatus. No. 2,088,465. Ernest Clark, Abington, Mass., to Abington Textile Machinery Works, Boston, Mass.

Process and composition for applying and fixing diazoimino dyestuffs. No. 2,088,506. Ivan F. Chambers to du Pont, both of Wilmington, Del.

Production azo dye. No. 2,088,726. Wilfred Archibald Sexton, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production polyazo dyestuffs. No. 2,088,907. Karl Holzach, Ludwigshafen-am-Rhine, Ludwig Neumann, Mannheim, and Hans Krzikalla, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production azo dyestuffs capable of being converted into complex metal compounds. No. 2,088,911. Hans Krzikalla and Bernhard Ritzenthaler, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation methine cyanine dye. No. 2,089,322. Walter Zeh, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Manufacture benzoselenocyanine dyes. No. 2,089,323. Walter Zeh, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production vat dyestuffs of the anthraquinone series. No. 2,089,435. Heinz Scheyer, Frankfort-am-Main, and Emil Schwamberger, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Production polymethine dyestuffs. No. 2,089,633. Paul Wolff and Gustav Schafer, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Process developing fabric printed with vat dyestuffs. No. 2,089,920. Hans Aubauer, Vienna, Austria, to General Aniline Works, Inc., New York City.

Explosives

Ignition composition comprising one of the compounds selected from the group of the silver and mercury derivatives of chlorinated azodicarbonamidine. No. 2,086,533. Lawton A. Burrows, Wenonah, N. J., to du Pont, Wilmington, Del.

Blasting explosive composition characterized by low density, comprising an organic explosive compound as sensitizing agent, and ammonium nitrate. No. 2,087,285. Stanley L. Handforth, Gordon Heights, Del., and Norman Gardner Johnson, Wenonah, N. J., to du Pont, Wilmington, Del.

Production ammonium picrate by reacting picric acid with gaseous ammonia. No. 2,088,636. Fred. F. Chapman to du Pont, both of Wilmington, Del.

Fine Chemicals

Manufacture anhydrides of monocarboxylic acids. No. 2,087,030. Harry Le B. Gray and Thos. F. Murray, Jr., Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation insolubilized halogen containing butadiene derivatives. No. 2,087,078. Herbert A. Winkelmann, Chicago, Ill., to Marbo Patents, Inc., corp. of Del.

Production N-vinyl-diarylamines. No. 2,087,079. Werner Wolff, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Composition for topical use, containing an astringent salt, a soap, wax, and alcohol. No. 2,087,161. Wm. C. Moore, Stamford, Conn., to U. S. Industrial Alcohol Co., New York City.

Solid or semi-solid composition for topical use; containing an astringent salt, wax, alcohol, and a modifier. No. 2,087,162. Wm. C. Moore, Stamford, Conn., to U. S. Industrial Alcohol Co., New York City.

Process polymerizing member of group of ester and nitrile derivatives of α-methacrylic acid; subjecting member of said group to polymerizing influences in presence of an oxygen yielding substance. No. 2,087,468. Wm. Chalmers, Vancouver, B. C., Canada, to Rohm & Haas Co., Phila., Pa.

Preparation aryl mercury compounds of heterocyclic imines and imides. No. 2,087,959. Carl N. Andersen, Watertown, Mass., to Lever Bros. Co., corp. of Me.

Preparation aryl mercury imino and imido compounds. No. 2,087,960. Carl N. Andersen, Watertown, Mass., to Lever Bros. Co., corp. of Me.

Preparation polyvalent metal salts of acid high molecular weight esters of polycarboxylic acids. No. 2,087,999. Paul L. Salzberg to du Pont, both of Wilmington, Del.

Production undecyl compounds. No. 2,088,015. Jacob N. Wickert, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Production nondecyl oxygenated compounds. No. 2,088,016. Jacob N. Wickert, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Preparation oxygenated aliphatic compounds derived from 2-ethylbutyraldehyde. No. 2,088,017. Jacob N. Wickert, Charleston, and Clare A. Carter, So. Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Oxygenated compounds derived from butyraldehyde and its derivatives. No. 2,088,018. Jacob N. Wickert, Charleston, and Benj. T. Freure, So. Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Preparation saturated tetradecyl oxygenated compounds. No. 2,088,021. Jacob N. Wickert, Charleston, and Benj. T. Freure, So. Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Preparation derivatives of 2-mercapto-arylthiazoles. No. 2,088,022. Ira Williams, Woodstown, N. J., to du Pont, Wilmington, Del.

Manufacture olefine bromides. No. 2,088,159. Ray H. Boundy and Walter E. Roush to Dow Chemical Co., all of Midland, Mich.

Manufacture anhydrides of citraconic acid and itaconic acid. No. 2,088,347. Georg Scheuing and Bruno Walach to C. H. Boehringer Sohn A. G. Chemische Fabrik, both of Nieder-Ingelheim-am-Rhine, Germany.

Stabilized aqueous solution of tannic acid comprising a neutral ester of p-hydroxybenzoic acid and an alkali metal bisulfite. No. 2,088,590. Wm. H. Engels and Harold J. Becker to Merck & Co., Inc., all of Rahway, N. J.

Preparation meta-N-alkylamino para alkoxy phenyl arsonic acid. No. 2,088,608. Geo. W. Raiziss, LeRoy W. Clemence, and Abraham I. Kremens, Phila., to Abbott Labs., No. Chicago, Ill.

Preparation amino alcohols. No. 2,088,941. Max Bockmuhl, Gustav Ehrhart, Leonhard Stein, and Julius Hallensleben, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York City.

Production double compounds of secondary amides of 3.5-dimethyl-isoxazole-4-carboxylic acid. Nos. 2,088,995-6. Max Hoffer, Basel, Switzerland, to Hoffmann-LaRoche, Inc., Nutley, N. J.

Preparation nitro-benzaldimercuric oxides. No. 2,089,006. Louis Spiegler, Woodbury, N. J., to du Pont, Wilmington, Del.

Production zinc hydroxylates of esters of parahydroxybenzoic acid, forming white crystalline powders, insoluble in water. No. 2,089,197. Wm. H. Engels and John Weijlard to Merck & Co., all of Rahway, N. J.

Photographic sensitizer material; comprising a silver halide emulsion containing a benzoselenazole-methine-cyanine salt. No. 2,089,321. Walter Zeh, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Photographic-silver-halide emulsion which contains a sensitizing dye. No. 2,089,729. Leslie G. S. Brooker, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Antihalation layer; photographic plate or film comprising a support bearing on one side a light-sensitive emulsion layer and on the other an antihalation layer consisting of an alkali-soluble resin having dye incorporated therein. No. 2,089,764. Wilhelm Schneider, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Glass and Ceramics

Manufacture safety glass. No. 2,087,090. Otto Hauffe, Eilenburg, Germany, to Deutsche Celluloid-Fabrik, Eilenburg in Saxony, Germany.

Manufacture laminated safety glass. No. 2,088,776. Brook J. Dennison, New Kensington, Pa., to Pittsburgh Plate Glass Co., Allegheny County, Pa.

Glass composition for electric gaseous discharge devices; composed of silica, alumina, boric oxide, magnesium oxide, and calcium oxide. No. 2,087,762. Herman Krefft, Berlin-Friedrichshagen, Germany.

Industrial Chemicals, etc.

Production high molecular alcohol; first adding to natural fats a hydrogenation catalyst. No. 20,447. Reissue. Walther Schrauth, Berlin-Dahlem, and Theodore Bottler, Rodleben, near Rosslau, Germany, to "Unichem" Chemikalien Handels, A.-G., Zurich, Switzerland.

Catalyst for oxidation reactions. No. 2,086,542. Wm. A. Douglass, Penns Grove, N. J., to du Pont, Wilmington, Del.

Process and apparatus for production oxygen. No. 2,086,567. Esley P. McCreery, Stockton, Calif., twenty per cent. to P. W. Stamps, Berkeley, and twenty per cent. to David B. Stamps, Stockton, Calif.

Production oxygen-rich gas from air. No. 2,086,778. Harry C. Peffer, deceased, late of West Lafayette, Ind., by Mary Caroline Peffer, executrix, West Lafayette, Ind., and Geo. H. Shepard and Geo. W. Sherman, Jr., West Lafayette, Ind.

Apparatus for recovery iodine. No. 2,086,825. Chas. F. Simpson, Alhambra, Calif., to General Salt Co., Ltd., Los Angeles, Calif.

Recovery anhydrous sodium sulfate. No. 2,086,902. Henry W. Doennecke and Emory E. Douglass, Tulsa, Okla., and Carl O. Anderson, Baxter Springs, Kans., to Ozark Chemical Co., Tulsa, Okla.

Apparatus for conditioning mixtures of granular solids and liquids for centrifuging. No. 2,086,951. Geo. E. Stevens, Scottsbluff, Nebr., to Western States Machine Co., Salt Lake City, Utah.

Process evaporating magnesium hydroxide. No. 2,087,006. Lloyd K. Riggs, Newark, N. J., to Chas. H. Phillips Chemical Co., Glenbrook, Conn.

Dehydrogenation of higher alcohols. No. 2,087,038. Edw. M. McMahon and John S. Kimble, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Chrome-magnesia refractory brick suitable for use without previous kiln firing. No. 2,087,107. Russell P. Heuer, Bryn-Mawr, Pa., to General Refractories Co., corp. of Pa.

Method regenerating phosphoric pickling bath. No. 2,087,230. Jean Adrien Marie Bigeon, Colombes, France, to La Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies, Etablissements Kuhlmann, Paris, France.

Reacting nitrosyl chloride with an oxide of chlorine to form an oxide of nitrogen and free chlorine. No. 2,087,278. Eugene D. Crittenden, Syracuse, N. Y., to Solvay Process Co., New York City.

Aluminum base alloy containing calcium and sodium, characterized by freedom from porosity attributable to presence of gas in metal. No. 2,087,269. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Method reducing ores; using slag resistor bath. No. 2,087,272. Raymond S. Wile, Flushing, N. Y., to Electric Smelters, Inc., Dover, Del.

Production alcohols in a continuous manner by catalytic hydration of olefins with a dilute acid catalyst. No. 2,087,290. Floyd J. Metzger to Air Reduction Co., Inc., both of New York City.

Production urea and ammonium salts. No. 2,087,325. Chas. K. Lawrence, Syracuse, N. Y., and Herman A. Beckhuis, Jr., Petersburg, Va., to Solvay Process Co., New York City.

Production carbon black. No. 2,087,391. Harry A. Toulmin, Jr., Dayton, O., to Commonwealth Engineering Corp., Wilmington, Del.

Apparatus for kiln drying. No. 2,087,454. Jos. I. Steel, Portland, Ore., to Moore Dry Kiln Co., corp. of Ore.

Cementing process; joining plurality of parts with an adhesive. No. 2,087,480. Earle C. Pitman, Lincroft, N. J., to du Pont, Wilmington, Del.

Preparation quaternary ammonium salts of high molecular weight acids. No. 2,087,506. Melvin De Groote, St. Louis, Mo., to Tretolite Co., Webster Groves, Mo.

Method bleaching, ageing flour and other milling products by treatment in dry form with chlorine-containing gas and a finely divided solid ammonium compound. No. 2,087,544. Frederick H. Penn, Dallas, Tex.

Method and composition for improving milling products, first mixing with dry product a dry, free flowing, finely powdered calcium hypochlorite and a dry, free-flowing, finely powdered ammonium compound. No. 2,087,545. Frederick H. Penn, Dallas, Tex.

Method and composition improving milling products; first mixing with dry product, a dry, free-flowing, finely powdered, high chlorine-containing calcium hypochlorite and a dry, free-flowing, finely powdered nitroso yielding compound. No. 2,087,546. Frederick H. Penn, Dallas, Tex.

Method and composition for treating milling products; first mixing with dry product a dry, free-flowing, finely powdered calcium hypochlorite and a dry, free-flowing, finely powdered organic peroxide. No. 2,087,547. Frederick H. Penn, Dallas, Tex.

Production acoustic material; aerating mixture of cement and water with suitable foaming agent, and after partial setting causing cell walls of material to become ruptured by applying vacuum. No. 2,087,550. John A. Rice, Berkeley, Calif., to Bubblestone Co., Pittsburgh, Pa.

Preparation quaternary ammonium compounds. No. 2,087,565. Gerhard Balle and Kurt Eisfeld, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Continuous process for preparation of chlorhydrin and recovery of urea. No. 2,087,591. Hyym E. Buc, Roselle, and Stewart C. Fulton, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Atomizer for atomizing liquids, emulsions, dispersions, etc. No. 2,087,627. Johan Ernst Nyrop, Copenhagen, Denmark.

Centrifugal separator for separating liquids, emulsions, and dispersions. No. 2,087,630. Frederick Casper Gunther Schelbeck, Copenhagen, Denmark.

Catalytically hydrogenating nucleus of a hydroxyphenyl group. No. 2,087,691. Wilbur A. Lazier, New Castle County, Del., to du Pont, Wilmington, Del.

Tank for purification of liquids. No. 2,087,851. Geo. M. Darby, Westport, Conn., to Dorr Co., Inc., New York City.

Recovery sulfur. Nos. 2,087,889-90-1-2-3-4. Raymond F. Bacon, Bronxville, N. Y., and Wilbur Judson, Newgulf, Tex.

Synthesis urea from ammonia and carbon dioxide at elevated temperatures and pressures. No. 2,087,980. Allen E. Lawrence to du Pont, both of Wilmington, Del.

Recovery hydrocyanic acid. No. 2,088,003. Fred. W. Sperr, Jr., Vineland, N. J., to Rohm & Haas Co., Phila., Pa.

Production sulfuric acid derivatives of secondary alcohols. No. 2,088,014. Jacob N. Wickert and Benj. T. Freure, So. Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Treating bath having high wetting and penetrating properties, comprising liquid treating agent, a neutral sulfate ester of a saturated higher branched-chain secondary monohydric alcohol. No. 2,088,019. Jacob N. Wickert, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Alcohol sulfation process. No. 2,088,027. Geo. H. Law and Raymond W. McNamee, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Manufacture terpineol from terpin hydrate. No. 2,088,030. Walter Christian Meuly, New Brunswick, N. J., to du Pont, Wilmington, Del.

Production pure anhydrous hydrofluoric acid. No. 2,088,048. Howard B. Bishop, Summit, N. J.

Production nitric acid from oxides of nitrogen. No. 2,088,057. Stanley L. Handforth, Woodbury, N. J., to du Pont, Wilmington, Del.

Production saturated aliphatic monohydric secondary and tertiary alcohols from an acid solution of their corresponding olefines. No. 2,088,083. Wm. Engs and Richard Moravee, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Production stable and efficient foam; adding to solution of a wetting agent free from unaltered carboxylic groups a solvent free from sulfate and sulfonic groups. No. 2,088,085. Eberhard Gross, Wuppertal-Elberfeld, Hanns Wappes, Ludwigshafen-am-Rhine, Bruno Hilgenfeldt, Wuppertal-Vohwinkel, and Albert Petz, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Method and apparatus for extracting sulfur from sulfur-bearing material. No. 2,088,190. Francis I. du Pont to Delaware Chemical Engineering Corp., both of Wilmington, Del.

Process for drying materials. No. 2,088,213. Robert L. Perkins, East Aurora, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Production oil press filter cloth, using an ammoniacal solution of cupric oxide in process. No. 2,088,222. Clarence B. White, Montclair, N. J.

Distillation hydrogen peroxide from solutions containing same. No. 2,088,239. Ludwig Hess, Berlin-Friedenau, Germany, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Method precipitating an insoluble metallic silicate from a relatively dilute solution of an alkali metal silicate by a solution of a salt of another metal. No. 2,088,281. Wm. Alvah Smith, Hamburg, N. Y.

Manufacture polymerization products from aldols. No. 2,088,367. John Vargas Eyre and Herbert Langwell, Epsom, England.

Production light-modifying article, applying neodymium-ammonia nitrate to a cellulosic material. No. 2,088,438. Nikolaus Riehl, Berlin-Lichtenberg, Germany to Degea Aktiengesellschaft (Auergesellschaft), Berlin, Germany.

Production halogenated ethers of resin alcohols. No. 2,088,535. Alfred L. Rummelsburg to Hercules Powder Co., both of Wilmington, Del.

Preparation 2-amino-5-aroylamino-benzoic acid. No. 2,088,667. Francis Leslie Rose, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Apparatus for preparing gypsum slabs. No. 2,088,813. Carlisle K. Roos, Wheaton, Ill., to U. S. Gypsum Co., Chicago, Ill.

Apparatus for removal sulfur compounds and other impurities from gases by means of a wet process. No. 2,088,814. Adolf Schmalenbach, Essen-am-Ruhr, Germany, to Koppers Co., Pittsburgh, Pa.

Hardening material resistant to heat, acid, corrosion, and abrasion, having formula CrB_2. No. 2,088,838. Norman W. Cole, Whittier, and Walter H. Edmonds, Los Angeles, Calif.

Preparation titanium and iron compounds. No. 2,088,913. Wm. Basil Llewellyn to Peter Spence & Sons, Ltd., both of Manchester, England.

Apparatus for making emulsions, etc. No. 2,088,926. Thos. Robinson, Smithtown, N. Y., to Lancaster Processes, Inc., New York City.

Apparatus for production phthalic anhydride and benzoic acid. No. 2,088,929. Max Scharff, Heidelberg, Johannes Brode, deceased, late of Ludwigshafen-am-Rhine, by Kathe Brode, administratrix, Ludwigshafen-am-Rhine, and Josef Reichart and Adolf Johannsen, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture alkyl borates. No. 2,088,935. Thos. H. Vaughn, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., New York City.

Preparation dichloro-indanthrones from higher chlorinated bodies; reacting higher chlorinated indanthrone bodies in an alkaline hydrosulfite solution in presence of a vatting assistant. No. 2,089,009. Otto Stallmann, So. Milwaukee, Wis., to du Pont, Wilmington, Del.

Manufacture glycerol monolactate; using glycerol and a lactic acid ester. No. 2,089,127. Ritchie Hart Lock, Chigwell, England, to Howards & Sons, Ltd., Ilford, England.

Manufacture sodium sulfate by treatment of sodium bicarbonate with calcium sulfate. No. 2,089,129. Robt. B. MacMullin, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Manufacture sodium sulfate by reaction between sodium bicarbonate and calcium sulfate in an aqueous medium. No. 2,089,130. Robt. Burns MacMullin, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Preparation sulfonated mixed ketones. No. 2,089,154. Anderson W. Ralston to Armour & Co., both of Chicago, Ill.

Production titanium dioxide; treating a titanium sulfate solution with operative alkaline earth metal compound. No. 2,089,180. L'Roche G. Bousquet and Benj. Wilson Allan, Balto., Md., and Hartmut W. Richter, Rahway, N. J., to American Zirconium Corp., St. Helena, Balto., Md.

Non-siccative complex; composition comprising reaction product of polyglycerol and sebacic acid. No. 2,089,196. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Preparation hydrotropic fatty material; condensation product of alkylolamine and a member of the group of fatty acids, their triglycerides, esters, amides, anhydrides, and halides. No. 2,089,212. Wolf Kritchevsky, Chicago, Ill.

Method and apparatus for burning mineral sulfides in gaseous suspension. No. 2,089,306. Byron Angus Stimmel, Kenneth Duncan McBean, and Graham Cruickshank, Trail, B. C., Canada, to Consolidated Mining & Smelting Co., of Canada, Ltd., Montreal, Que., Canada.

Manufacture amino sulfonic acids. No. 2,089,348. Arnold Doser, Rudolf Schroter, and Otto Bayer, Leverkusen, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture boric acid. No. 2,089,406. Alfred Newman, Tompkinsville, N. Y., to Pacific Coast Borax Co., New York City.

Preparation catalyst; heating to its spontaneous decomposition temperature a multiple chromate of a nitrogen base and a hydrogenating metal, thereafter extracting resulting chromite composition with aqueous ammonia. No. 2,089,433. Paul L. Salzberg, Edge Moor, Del., to du Pont, Wilmington, Del.

Preparation polymerized styrene. No. 2,089,444. Hermann Staudinger, Freiburg, Breisgau, and Werner Heuer, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Refrigerant brine; method producing cryogen. No. 2,089,467. Clark W. Chamberlain to Kold-Hold Mfg. Co., both of Lansing, Mich.

Production normal butyl alcohol, acetone, and ethyl alcohol. No. 2,089,522. John C. Woodruff, Hugh R. Stiles, and David A. Legg to Commercial Solvents Corp., all of Terre Haute, Ind.

Production condensation products in a single phase reaction; using mixture of polymerized vinyl acetate, hydrochloric acid, formaldehyde solution, and paraldehyde. No. 2,089,530. Maurice Belloc to Societe Nobel Francaise (Societe Anonyme), both of Paris, France.

Mercury vapor rectifier. No. 2,089,540. Walter Dallenbach, Berlin-Charlottenburg, Germany.

Recovery sodium sulfate from solutions containing same together with boric acid and contaminating amounts of iron and aluminum. No. 2,089,557. Karl J. Jacobi, Roselle, N. J., to Pacific Coast Borax Co., N. Y. City.

Process and apparatus for separating vapors from gaseous mixtures. No. 2,089,558. Ernst Karwat, Grosshesselohe, near Munich, Germany, to Union Carbide & Carbon Corp., New York City.

Production normal butyl alcohol, acetone, and ethyl alcohol. No. 2,089,562. David A. Legg and Hugh R. Stiles to Commercial Solvents Corp., Terre Haute, Ind.

Preparation addition products of glycide to organic compounds, being auxiliary products for textile industry. No. 2,089,569. Ludwig Orthner and Claus Heuck, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, Inc., New York City.

Dispersion method; first preparing emulsion of an insoluble, aromatic, organic, solid, colorless compound. No. 2,089,606. Winfield Walter Heckert, Ardentown, Del., to du Pont, Wilmington, Del.

Carbon dioxide liquefier. No. 2,089,609. Harry S. Houghton, San Marino, Calif.

Production compressed wood or plywood from wood veneers, superimposing layers of wood veneer coated with a binding agent. No. 2,089,644. Alexandre de Samsonow, Brussels, Belgium.

Electrolyte suitable for use with film-forming electrodes, consisting of inorganic film-forming ionogen, an ammoniated compound of an acid, and an ammoniated compound of a fatty oil acid. No. 2,089,686. Frank M. Clark and Goldner F. Lipsey, Pittsfield, Mass., to General Electric Co., corp. of New York.

Electrolytic impregnating composition consisting of ammonium salts of boric acid, lactic acid, and acetic acid. No. 2,089,687. Frank M. Clark and Ralph A. Ruscetta, Pittsfield, Mass., to General Electric Co., corp. of New York.

Manufacture synthetic aliphatic organic monocarboxylic acids by catalytic addition of carbon monoxide and water to olefinic hydrocarbons at elevated temperature and pressure. No 2,089,903. Alfred T. Larson to du Pont, both of Wilmington, Del.

Improvements in production chlorine dioxide; reacting an aqueous solution of a metal chlorate with sulfur dioxide in presence of an inert gaseous diluent. No. 2,089,913. Geo. Lewis Cunningham, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Leather

Method manufacturing shoes; using polymerized chloroprene in process. No. 2,087,878. Walter H. Wedger, Belmont, Mass., to B. B. Chemical Co., Boston, Mass.

Metals, Alloys, Ores

Metallurgical process; treatment ore material containing metal of the group molybdenum and vanadium. No. 2,086,570. Ralph F. Meyer, Freeport, Pa., to Meyer Mineral Separation Co., Pittsburgh, Pa.

Production copper-titanium-silicon alloys. No. 2,086,604. Geo. F. Comstock, Niagara Falls, N. Y., to Titanium Alloy Mfg. Co., N. Y. City.

Production nickel and iron carbonyls. No. 2,086,881. Leo Schlecht and Max Naumann, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Recovery tin from anhydrous stannic chloride. No. 2,086,894. Jesse O. Betterton and Yurii E. Lebedeff, Metuchen, N. J., to American Smelting & Refining Co., New York City.

Weld rod comprising a metallic composition containing molybdenum, tungsten, boron, nickel, and iron. No. 2,087,202. Anthony G. de Golyer, New York City, to Vulcan Alloy Corp., corp. of Del.

Ferrous alloy; magnet formed of a precipitation-hardened carbon-free binary alloy of iron and titanium. No. 2,087,336. Kaare S. Seljesaeter, Chicago, Ill., to Western Electric Co., Inc., New York City.

Method solidifying molten metals. No. 2,087,347. Bernard M. Larsen, Elizabeth, N. J., to U. S. Steel Corp., New York City.

Process controlling grain size of steel. No. 2,087,580. Rene Perrin to Societe d' Electrochimie, d' Electrometallurgie & des Acieries Electriques d' Ugine, both of Paris, France.

Process smelting phosphatic material and a compound of group of chromium, tungsten, molybdenum and vanadium, to produce a low carbon phosphorus alloy. No. 2,087,719. Albert Grobstein, Washington, D. C.

Hot worked graphitizable ferrous base alloy containing a graphitizing agent and carbon. No. 2,087,764. Frederick R. Bonte to Timken Roller Bearing Co., both of Canton, O.

Manufacture ferrous metal. No. 2,087,768. Duncan P. Forbes, Rockford, Ill., and Erwin J. Mohr, deceased, late of Rockford, Ill., by Linda E. Mohr, administratrix, Milwaukee, Wis., to Gunite Foundries Corp., Rockford, Ill.

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NATIONAL N QUALITY

Production aluminum-base alloys. Nos. 2,087,988-9-90-1-2-3-4. Jos. A. Nock, Jr., Tarentum, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Production magnesium, using mixture of a reducible compound of magnesium, a carbonaceous reducing agent, and a freely carbonizing binding agent. No. 2,088,165. Konrad Erdmann, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Protecting magnesium and material rich in magnesium against oxidation during melting and pouring. No. 2,088,204. Fritz Hansgirg, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Production alloy containing beryllium, iron, and copper. No. 2,088,219. Horace F. Silliman to American Brass Co., both of Waterbury, Conn.

Separation gold from gold alloys. No. 2,088,250. Wilhelm Truthe, Frankfort-am-Main, Germany, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Flotation process; separation potassium chloride from pulp containing same. No. 2,088,325. James Emory Kirby to du Pont, both of Wilmington, Del.

Apparatus for spraying or squirting metal. No. 2,088,348. Heinrich Schlupmann, Berlin-Niederschoneweide, Germany.

Apparatus for purifying plating solutions. No. 2,088,498. Robert H. Tull, East Springfield, Mass., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Carburizing box with inner surface resistant to carbon penetration. Nos. 2,088,593-4. Henry H. Harris, Boston, Mass.

Electrodeposition of chromium. No. 2,088,615. Max Schlotter, Berlin, Germany.

Melted and cast alloy composed of carbon, tungsten, cobalt, and vanadium. No. 2,088,825. Elmer B. Welch, McKeesport, Pa., to Firth-Sterling Steel Co., both of McKeesport, Pa.

Extraction gold and silver from their ores; subjecting ore to dissolving action of a solvent cyanide in presence of complex cobalt cyanides and air. No. 2,088,844. Baxeres de Alzugaray, New York City.

Application patina to a copper body; establishing a basic solution comprising SO_3 and CO_3 radicals and subjecting copper body to anodic treatment therein. No. 2,088,868. Frank F. Poland, Balto., Md., to American Smelting & Refining Co., New York City.

Tool composition comprising base of super-hard titanium compound and a tantalum metal matrix or cementing agent. No. 2,088,981. Wm. Bayard Sturgis, Chicago, Ill.

Apparatus for purification of liquids. No. 2,089,160. Geo. M. Darby, Westport, Conn., to Dorr Co., New York City.

Ferric alloy process. No. 2,089,222. Pearson M. Payne, Denver, Colo.

Manufacture magnesium products from brines containing convertible magnesium salts. No. 2,089,339. Heinz H. Chesny, San Mateo, Calif., to Marine Chemicals Co., Ltd., San Francisco, Calif.

Production gas for carburization of steel. No. 2,089,545. John A. Dow, Detroit, Mich.

Method inhibiting corrosion of copper and its alloys by hydrocarbon liquid fuels ranging from liquefied petroleum gases through kerosene. Nos. 2,089,579-80. Walter A. Schulze to Phillips Petroleum Co., both of Bartlesville, Okla.

Denture formed from alloy containing nickel, chromium, and beryllium. No. 2,089,587. Enrique G. Touceda to Consolidated Car Heating Co., Inc., both of Albany, N. Y.

Method and apparatus for rustproofing metal articles. No. 2,089,648. Robt. H. Gordon to Parker Rust Proof Co., both of Detroit, Mich.

Method melting finely divided aluminum. No. 2,089,742. Louis O. Garwin, Cleveland Heights, O.

Production shiny, finished wire; applying lime coating to wire, contacting with a wet lubricant associated with an organic substance, then drawing through a reducing die while coating is wet. No. 2,089,883. Frank H. Ellsworth, Worcester, Mass., to American Steel and Wire Co. of N. J., corp. of N. J.

Naval Stores

Separation pine gum into fractions; first subjecting gum to action of vacuum filtration, then dissolving in turpentine, followed by recrystallization process. No. 2,086,777. Samuel Palkin and Thos. H. Harris, Jr., Washington, D. C., to the free use of the public.

Process modifying mechanical properties of magnesium alloys. No. 2,087,262. Alfred John Murphy, Petts Wood, England, to Magnesium Development Corp., corp. of Del.

Paper and Pulp

Grease repellent paper; using coating of a polybasic organic acid-polyhydric alcohol resin containing a higher fatty acid in chemical combination. No. 2,086,903. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Production aluminum electrode for electrolytic condensers; subjecting electrode to etching action of an aqueous solution of copper chloride. No. 2,086,993. Joseph John Barrett to Magnavox Co., both of Fort Wayne, Ind.

Production absorbent paper; using caustic soda solution in process. No. 2,088,524. Louis Leonard Larson, Hockessin, and Geo. Lewis Schwartz, Wilmington, Del., to Celastic Corp., Arlington, N. J.

Production varnishing grade of uncoated paper. No. 2,088,893. Leroy C. Cates, Westbrook, Me., to S. D. Warren Co., Boston, Mass.

Method rendering paper, etc., sensitive to ink eradicating chemicals, by incorporating therein a 4:4′-di(benzoylamino) stilbene 2:2′-disulfonic acid compound. No. 2,089,293. Clifford Paine and Jack Augustus Radley, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Paper coating composition; forming slurry of a base pigment mixed with water and hydrated lime, then causing alum to react with a portion of the lime, leaving the rest as free lime. No. 2,089,480. Clark C. Heritage, Rumford, Me., to Oxford Paper Co., corp. of Me.

Petroleum Chemicals

Dewaxing oil process. No. 2,086,666. Harmon F. Fisher to Union Oil Co. of Calif., both of Los Angeles, Calif.

Process desulfurizing hydrocarbon oil. No. 2,087,048. Walter A. Schulze to Phillips Petroleum Co., both of Bartlesville, Okla.

Production low boiling hydrocarbons. No. 2,087,268. Howard W. Sheldon, Haddonfield, N. J., to Houdry Process Corp., Dover, Del.

Process and apparatus for treating hydrocarbon oils. No. 2,087,422. Malcolm P. Youker to Phillips Petroleum Co., both of Bartlesville, Okla.

Separating aromatic hydrocarbons adapted for use as solvents in preparation of lacquer and varnish from cracked naphtha containing unsaturated, aromatic, naphthenic and paraffinic hydrocarbons. No. 2,087,455. Wm. M. Stratford to Texas Co., both of New York City.

Refinement mineral oil containing relatively low and high viscosity index constitutents to separate therefrom a relatively high viscosity index fraction. No. 2,087,473. Francis X. Govers, Vincennes, Ind., to Indian Refining Co., Lawrenceville, Ind.

Hydrocarbon oil conversion. No. 2,087,507. Carbon P. Dubbs to Universal Oil Products Co., both of Chicago, Ill.

Treatment hydrocarbon oils; subjecting distillate in heated vaporous condition to action of hydrochloric acid solution and added steam and free oxygen in presence of active clay. No. 2,087,525. Jacque C. Morrell and Gustav Egloff to Universal Oil Products Co., all of Chicago, Ill.

Apparatus for conversion of hydrocarbons. No. 2,087,533. Malcolm P. Youker to Phillips Petroleum Co., both of Bartlesville, Okla.

Conversion gaseous hydrocarbons containing olefins into liquid hydrocarbons. No. 2,087,540. Jesse A. Guyer to Phillips Petroleum Co., both of Bartlesville, Okla.

Mineral oil composition for insulating electric conductors, comprising refined, aromatic-free oil and a relatively more volatile aromatic hydrocarbon. No. 2,087,578. Gerrit Willem Nederbragt, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Motor fuel for internal combustion engines; comprising light petroleum distillate, a tertiary alcohol, and a lead alkyl anti-knock compound. No. 2,087,582. Helmuth G. Schneider, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Lubricating oil composition for internal combustion engines, containing a lubricating oil and a "hydroformed" naphtha. No. 2,087,585. Wm. J. Sweeney and Joshua A. Tilton, Baton Rouge, La., to Standard-I. G. Co., corp. of Del.

Method inhibiting gum formation in low boiling hydrocarbon oils and products obtained thereby. No. 2,087,597. Carlos L. Gutzeit, Ithaca, N. Y., to Standard Oil Development Co.

Manufacture blending agents for lubricating compositions. No. 2,087,603. Louis A. Mikeska and Chas. F. Smith, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Hydrogenation distillable carbonaceous materials. No. 2,087,608. Mathias Pier, Heidelberg, and Walter Simon and Walter Kroenig, Ludwigshafen-am-Rhine, Germany, to Standard-I. G. Co., Linden, N. J.

Preparation metallo hydrocarbon compounds. No. 2,087,656. Francis Owen Rice, Balto., Md., to Standard Oil Co., Chicago, Ill.

Preparation organic lead compounds and hydrocarbon liquids containing same. No. 2,087,660. Fred W. Sullivan, Jr., Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Production pour inhibitors for wax-containing oils. No. 2,087,682. Garland H. B. Davis, Baton Rouge, La., and Chas. C. Swoope, Bayonne, N. J., to Standard Oil Development Co.

Lubricant; grease containing a hydrocarbon oil and a soap of a halogenated higher fatty acid of the aliphatic series. No. 2,087,803. Bert H. Lincoln and Alfred Henriksen, Ponca City, Okla., to Lubri-Zol Development Corp., Cleveland, O.

Treatment petroleum emulsion to separate oil and water therein. No. 2,087,936. Abraham M. Herbsman, Huntington Park, Calif., to Industrial Patents, Ltd., Los Angeles, Calif.

Motor fuel composition composed of gasoline and a mixture of acetone, alcohol and naphthalene. No. 2,088,000. Will R. Savage, Omaha, Nebr., one-half to Harry S. Haze, Chicago, Ill.

Extreme pressure lubricant, comprising hydrocarbon lubricating oil and the reaction product of mercaptan-substituted fatty acid and stannic chloride. No. 2,088,193. Wm. L. Evers, Woodbury, N. J., to Socony-Vacuum Oil Co., Inc., New York City.

Refining sludge-free hydrocarbon oil containing mineral acid esters. No. 2,088,216. Edmond R. P. E. Retailliau, Wood River, Ill., to Shell Development Co., San Francisco, Calif.

Method refining crude mineral oil, using mixture of concentrated sulfuric acid and concentrated phosphoric acid in process. No. 2,088,406. Frank M. Clark, Pittsfield, Mass., to General Electric Corp., Schenectady, N. Y.

Separation hydrocarbon mixtures; extracting hydrocarbon mixture with a furfurylamine to separate non-paraffinic compounds from paraffinic compounds. No. 2,088,441. Paul L. Salzberg to du Pont, both of Wilmington, Del.

Process and apparatus for contacting fluids. No. 2,088,497. Sijbren Tijmstra, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Acetylenization of mineral oils. No. 2,088,500. Hein Israel Waterman, Delft, Netherlands, to Shell Development Co., San Francisco, Calif.

Manufacture alkylated cyclic hydrocarbons. No. 2,088,598. Vladimir Ipatieff and Aristid V. Grosse to Universal Oil Products Co., all of Chicago, Ill.

Manufacture lubricating oils. No. 2,088,616. John E. Schulze to Red River Refining Co., both of Chicago, Ill.

Apparatus and vapor purification and cracking method for petroleum oils. No. 2,088,756. Ernest A. Ocon, New York City.

Art cracking hydrocarbon oils. No. 2,088,778. Howard Dimmig, New York City, to Gasoline Products Co., Inc., Newark, N. J.

Polymerization of unsaturated hydrocarbon. No. 2,088,823. Cary R. Wagner to Pure Oil Co., both of Chicago, Ill.

Polymerization hydrocarbon gases. No. 2,088,824. Cary R. Wagner to Pure Oil Co., both of Chicago, Ill.

Polymerization hydrocarbon gases. No. 2,088,886. Cary R. Wagner to Pure Oil Co., both of Chicago, Ill.

Treatment cracked hydrocarbon gases. No. 2,088,887. Cary R. Wagner to Pure Oil Co., both of Chicago, Ill.

Lubricating oil composition water free and fluid at ordinary temperatures. No. 2,088,898. Ferdinand W. Breth, Petrolia, Pa., to Standard Oil Development Co., corp. of Del.

Conversion hydrocarbon oils. No. 2,088,987. Chas. H. Angell to Universal Oil Products Co., both of Chicago, Ill.

Production anti-knock motor fuel comprising gasoline type hydrocarbons and a small amount of the mercuric salt of cobalt carbonyl hydride. No. 2,088,997. Nicolaas Max, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Qualitative analysis of used mineral crankcase oils. No. 2,089,017. Robert E. Burk to Standard Oil Co., both of Cleveland, O.

Process for treating cognate liquids of a well. No. 2,089,035. Wm. A. Oberlin, Ventura, Calif., to Tretolite Co., Webster Groves, Mo.

Apparatus for separating wax from oil. No. 2,089,122. Leo D. Jones to Sharples Specialty Co., both of Philadelphia, Pa.

Apparatus for orienting cores. No. 2,089,216. Edw. D. Lynton, Glendale, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

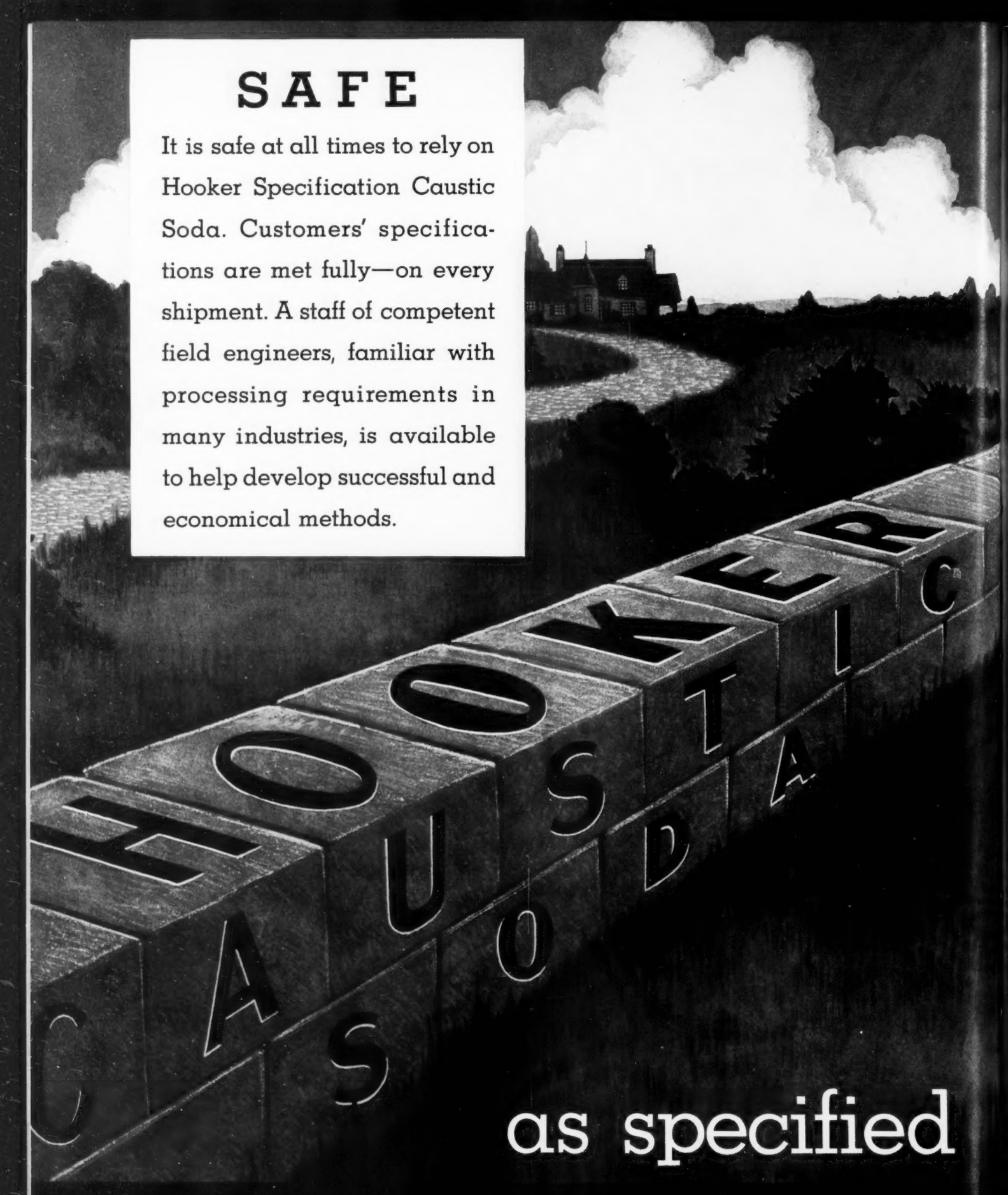
Dual two-stage cracking apparatus for petroleum oils. No. 2,089,292. Ernest A. Ocon, New York City.

Apparatus for treatment hydrocarbons. No. 2,089,360. Pierre Guichard, Marseille, France.

Apparatus for cracking oil. No. 2,089,361. Pierre Guichard, Marseille, France.

Apparatus for treating hydrocarbon oils. No. 2,089,373. Robt. W. Henry, Okmulgee, and James A. Reid and Walter A. Schulze, Bartlesville, Okla., to Phillips Petroleum Co., Bartlesville, Okla.

Manufacture lubricant. No. 2,089,506. Harold M. Rosen, Muskegon, Mich.



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Production motor fuel from petroleum oil. No. 2,089,511. Malcolm H. Tuttle, New Rochelle, N. Y., to Gyro Process Co., Detroit, Mich.

Lubricating apparatus. No. 2,089,523. Benj. F. Wupper to Stewart-Warner Corp., both of Chicago, Ill.

Hydrogenation and cracking of hydrocarbon oils. No. 2,089,616. Ralph H. McKee to Ernest A. Ocon, both of New York City.

Production low pour point oils. No. 2,089,655. Frederick H. MacLaren, Calumet City, Ill., to Standard Oil Co., Chicago, Ill.

Production anti-knock motor fuel distillate. No. 2,089,658. Jacque C. Morrell to Universal Oil Products Co., both of Chicago, Ill.

Conversion hydrocarbon oils. No. 2,089,659. Jacque C. Morrell to Universal Oil Products Co., both of Chicago, Ill.

Conversion hydrocarbon oils. No. 2,089,668. Jean Delattre Seguy to Universal Oil Products Co., both of Chicago, Ill.

Production high pressure and high temperature lubricant. No. 2,089,680. Victor R. Abrams, Brunswick, Ga., and Carroll A. Hochwalt, Oakwood, Ohio, to Sulfo Corp. of America, Boston, Mass.

Treatment hydrocarbon oil. No. 2,089,760. Auguste J. Paris, Jr., Bradford, Pa.

Pigments, Dry Colors and Fillers

Processing pigment dispersions. No. 2,086,997. Emile C. de Stubner, New York City.

Resins, Plastics, etc.

Manufacture oil-resistant, extrudable resinous composition which is permanently flexible, elastic and plastic, comprising totally cured comminuted flexible alkyd resin. No. 2,087,096. Moyer M. Safford to General Electric Co., both of Schenectady, N. Y.

Decolorization of a polymerized coumarone-indene resin; mixing resin in solution in solvent consisting of paraffin hydrocarbon naphtha solvents with a clay. No. 2,087,457. Chas. A. Thomas and Wm. H. Carmody, Dayton, O., to Monsanto Chemical Co., St. Louis, Mo.

Production acrylic acid and its esters. No. 2,087,466. Walter Bauer and Hellmuth Lauth, Darmstadt, Germany, to Rohm & Haas Co., Phila., Pa.

Aqueous carroting solution for treating fur, etc., containing an oxidizing agent, an acid hydrolyzer, also an inhibitor comprising a water-soluble, organic, sulfur-containing compound. No. 2,087,856. Constantine F. Fabian, Brookfield, Conn., and Alexander N. Sachanen, Woodbury, N. J., to Non-Mercuric Carrot Co., Danbury, Conn.

Phenolic resin composition; solution of a reaction product of a ketone xylenol, and an aldehyde in a drying oil. No. 2,087,853. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Chewing gum base containing hydrogenated coumarone-indene resin. No. 2,087,900. Wm. H. Carmody to Neville Co., both of Pittsburgh, Pa.

Preparation oil soluble synthetic resin composition. No. 2,088,035. Sydney Leonard Morgan Saunders, London, England.

Manufacture polyhydric alcohol-polybasic acid resin. No. 2,088,612. Israel Rosenblum, Jackson Heights, N. Y.

Manufacture laminated products; first impregnating a porous flexible fibrous web with an aqeuous solution of a resinous partial condensation product. No. 2,089,034. James V. Nevin, Aberdeen, Wash.

Preparation synthetic resins and balsams from glycol. No. 2,089,181. Theo. F. Bradley, Westfield, N. J., to Ellis-Foster Co., Montclair, N. J.

Resin acid ester; reaction product of a monohydric heterocyclic alcohol and abietic acid, the unsaturation of a radical of which is reduced by hydrogen. No. 2,089,375. Irvin W. Humphrey and Jos. N. Borglin to Hercules Powder Co., all of Wilmington, Del.

Electrical resistor of the molded type having as a binder a thermoplastic substance. No. 2,089,425. Eugene C. Ragatz and Bernhard F. Tellkamp to Allen-Bradley Co., all of Milwaukee, Wis.

Plastic composition; vulcanizing rubber composition including a thermal carbon black of non-flocculent nature and a wax of high melting point. No. 2,089,809. Nicholas J. Penning to Penolite Corp., both of Chicago, Ill.

Plastic composition; breaking down rubber base, adding vulcanization agent, and part of a filler of rubber dust, using dispersing and softening agent and wax. No. 2,089,810. Nicholas J. Penning to Penolite Corp., both of Chicago, Ill.

Compositions containing synthetic resins; composite of xylenol acetaldehyde resin and drying oil, treated with a formaldehyde component. No. 2,089,828. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Rubber

Preservation rubber, incorporating therein an antioxidant consisting of a composite condensation product. No. 2,087,199. Albert M. Clifford, Stow, O., to Wingfoot Corp., Wilmington, Del.

Vulcanization rubber in presence of a basic nitrogen-containing accelerator and chloro methyl benzothiazyl sulfide. No. 2,087,200. Albert M. Clifford, Stow, O., to Wingfoot Corp., Wilmington, Del.

Preparation mixed aqueous dispersions of rubber and a polymer of chloro-2-butadiene-1,3, using a water soluble salt of a sulfuric acid ester of a normal straight chain primary aliphatic alcohol in process. No. 2,088,407. Benton Dales, Chadds Ford, Pa., and Fred. Baxter Downing, Carneys Point, N. J., to du Pont, Wilmington, Del.

Method devulcanizing soft vulcanized rubber; using diphenylguanidine in process. No. 2,088,920. Francis Norman Pickett, Westminster, London, England, to United States Rubber Products, Inc., New York City.

Preservation rubber by treatment with reaction product of quinoline and aniline. No. 2,089,302. Waldo L. Semon, Cuyahoga Falls, and Arthur W. Sloan, Akron, O., to B. F. Goodrich, Co., New York City.

Preparation halogenated amorphous rubber hydrohalide. No. 2,089,398. Eugene W. Moffett, Chicago, Ill., to Marbo Patents, Inc., corp. of Del.

Production paint solutions from rubber. No. 2,089,877. Edward Orland Coats, Warrensburg, Mo., one-half to Henry Bishop Stratton, two-tenths to Cleo Rucker, and eight-tenths to Irene Coats, all of Warrensburg, Mo.

Method producing a non-uniform distribution of rubber in a latex-impregnated web. No. 2,089,925. Stephen B. Neiley, Winchester, Mass., to Dewey & Almy Chemical Co., North Cambridge, Mass.

Textile, Rayon

Production yarns from a solution containing cellulose acetate and copper oleate. No. 2,086,543. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Method forming spun yarn containing short lengths of filament comprising organic derivatives of cellulose, incorporating in filaments subsequent to spinning a solution containing a solid electrolyte dissolved in an aqueous volatile alcohol. No. 2,086,544. Camille Dreyfus, New York City.

Manufacture staple fibers, using cellulose acetate in process. No. 2,086,590. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Manufacture artificial filaments, threads, etc., using spinning solution containing a deliquescent inorganic salt and extruding solution into a setting medium. No. 2,086,591. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Method and apparatus for making artificial silk, etc. No. 2,086,651. Leo Ubbelohde, Berlin-Charlottenburg, Germany.

Process improving wool without changing dyeing capabilities, treating clean, dry wool after grease extraction with formic acid vapor diluted with air in absence of water. No. 2,086,676. Alexander Nathanson, Berlin-Wilmersdorf, Germany, to Deutsche Kunstseiden-Studiengesellschaft m. b. H., Berlin, Germany.

Manufacture wool substitute; first precipitating viscose in form of threads to cellulose xanthogenate. No. 2,086,888. Walther Zetzsche, Erich Graumann, Hermann Faber, and Edmund Stix, Premnitz, Germany, to I. G., Frankfort-am-Main, Germany.

Viscose process and apparatus. No. 2,087,016. Wm. Henry Bradshaw, Buffalo, N. Y., and Edward R. McKee, Hermitage, Tenn., to du Pont, Wilmington, Del.

Manufacture homogeneous piled surface material; depositing attenuated fibers of a cellulosic derivative in a layer of an adhesive composition including a substance having a solvent action on cellulosic derivative. No. 2,087,260. Louis P. Miller, Brooklyn, N. Y., to Research Corp., New York City.

Spinning solution for production artificial materials, comprising cellulose acetate dissolved in a solvent mixture containing acetone and water. No. 2,087,317. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, New York City.

Apparatus for treatment textile articles with a liquid medium. No. 2,087,319. Bradford C. Gibbs, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Process preserving animal and vegetable fibers in mixed fabrics; introducing into dye bath an acid sulfuric acid ester of a compound from the class of aliphatic, cycloaliphatic, and mixed aromatic-aliphatic compounds. No. 2,087,284. Fritz Guenther and Conrad Schoeller, Ludwigshafen-am-Rhine, Hans Haussmann and Hermann Schuette, Mannheim, and Joseph Nuesslein, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Aqueous carroting solution for treating fur, etc., containing an oxidizing agent, an acid hydrolyzer, also an inhibitor comprising a water-soluble, organic, oxygen-containing compound. No. 2,087,854. Constantine F. Fabian, Brookfield, Conn., and Alexander N. Sachanen, Woodbury, N. J., to Non-Mercuric Carrot Co., Danbury, Conn.

Aqueous carroting solution for treating fur, etc.; containing an oxidizing agent, an acid hydrolyzer, also an inhibitor comprising a water-soluble, organic, nitrogen-containing compound. No. 2,087,855. Constantine F. Fabian, Brookfield, Conn., and Alexander N. Sachanen, Woodbury, N. J., to Non-Mercuric Carrot Co., Danbury, Conn.

Production synthetic resinous or resinoid products, comprising resinous reaction product of a mixture in which the sole reacting ingredients are substituted aromatic-organic acid with glycerol. No. 2,087,852. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Aqueous carroting solution for treating fur, etc., containing an oxidizing agent, an acid hydrolyzer, also an inhibitor comprising a water-soluble, organic, oxygen-containing, carbo-acid compound. No. 2,087,857. Constantine F. Fabian, Brookfield, Conn., and Alexander F. Sachanen, Woodbury, N. J., to Non-Mercuric Carrot Co., Danbury, Conn.

Process for finishing artificial thread. No. 2,087,946. Chas. Chatin, Izieux, France, to du Pont, Wilmington, Del.

Manufacture artificial threads, etc., from cellulose, first acting upon viscose with a halogen fatty acid. No. 2,087,981. Leon Lilienfeld, Vienna, Austria.

Improving crease-resistance textiles by impregnating with a solution of a reaction product of urea and formaldehyde. No. 2,088,227. Albert Edward Battye, John Thompson Marsh, Jos. Tankard, Wm. Harling Watson, and Frederick Charles Wood, to Tootal Broadhurst Lee Co., Ltd., all of Manchester, England.

Production dull luster filaments from cellulosic spinning solutions. No. 2,088,558. Hugo Hofmann, Elizabethton, Tenn., to American Bemberg Corp., New York City.

Production highly twisted crepe threads of filaments of an organic cellulose derivative. No. 2,088,587. Henry Dreyfus, London, England, and Wm. Whitehead, Cumberland, Md., to Celanese Corp., of America, corp. of Del.

Manufacture artificial materials of permanently increased resistance to the delustering action of hot aqueous media. No. 2,088,589. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production highly twisted crepe threads of filaments of an organic cellulose derivative. No. 2,088,628. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Manufacture films, foils, sheets, etc., from cellulose derivatives. No. 2,088,642. Henry Dreyfus, London, England.

Method washing textiles containing cellulose esters, by application of an acid which forms a detergent soap with a strong base, afterwards using aqueous bath. No. 2,088,674. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Production filaments, yarns, etc., of subdued luster. No. 2,088,675. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Production artificial silk. No. 2,088,858. Emil Hubert, Dessau-Ziebigk, and Hans Dannenberg, Dessau, Germany, to I. G., Frankfort-am-Main, Germany.

Apparatus for spinning artificial threads. No. 2,089,159. Hans Dannenberg, Dessau, and Emil Hubert, Dessau-Ziebigk, Germany, to I. G., Frankfort-am-Main, Germany.

Production highly twisted crepe thread of filaments of an organic derivative of cellulose. Nos. 2,089,187-8-9-190. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Production highly twisted crepe thread of filaments of a cellulose organic derivative. No. 2,089,191. Henry Dreyfus, London, and Donald Finlayson, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production highly twisted cellulose acetate crepe threads. No. 2,089,192. Henry Dreyfus, London, England.

Production crepe yarn. Nos. 2,089,193-4. Henry Dreyfus, London, England.

Manufacture artificial materials. No. 2,089,198. Donald Finlayson and Frank Happey, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production crimped filaments, yarns of fibers. No. 2,089,199. Donald Finlayson, Spondon, near Derby, and Frank Happey, Cleckheaton, England, to Celanese Corp. of America, corp. of Del.

Apparatus for manufacture or treatment textile threads. No. 2,089,200. Donald Finlayson, Ernest Leslie Greenwood, and Chas. Helme, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Operation and apparatus in which twist is imparted to threads. No. 2,089,229. Wm. Ivan Taylor and Alfred Herbert Woodruff, Spondon, near Derby, England, to Celanese Corp. of America.

Preparation crepe yarns containing individual filaments of organic derivatives of cellulose. No. 2,089,238. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Apparatus for treatment artificial textiles. No. 2,089,239. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Production highly twisted crepe thread of filaments of an organic derivative of cellulose. Nos. 2,089,240-1. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Production novel effects on textiles; material containing an aminostilbene-sulfonic acid. No. 2,089,413. Clifford Paine, Jack Augustus Radley, and Leslie Paige, Rendell, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Method imparting high twist to yarns containing a thermoplastic derivative of cellulose. No. 2,089,778. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Water, Sewage Treatment

Water-softening apparatus. No. 2,086,607. Emmett J. Culligan, LaGrange, Ill., to National Aluminate Corp., Chicago, Ill.

Apparatus for sterilizing and purifying water in batches. No. 2,087,136. Orrin E. Andrus, Milwaukee, Wis.

Water softening method. No. 2,087,157. Leroy C. Lind, Rockford, Ill.

Treatment industrial water containing at least one dissolved compound of a metal to render water suitable as feed water to boilers and other analogous purposes. No. 2,087,264. Benj. Poisner to Economy Labs. Co., both of No. Kansas City, Mo.

Improved method purification sewage by coagulants. No. 20,451. Reissue. Georg Ornstein, Berlin, Germany.

Water softening apparatus. No. 2,088,104. Arthur C. Zimmerman to Duro Co., both of Dayton, O.

Process for concentrating activated sewage sludge. No. 2,089,162. Raymond F. Goudey and Schuyler M. Bennett, Los Angeles, Calif.

Ammonia for Irrigation

Irrigated agriculture prevails in semi-arid and arid regions, in which the natural waters are characterized by high concentration of total salts and where the soils receive insufficient leachings with pure water. Fertilizer practice in such agriculture brings with it unique problems with regard to distribution of fertilizer and especially with regard to the residues that may be left in the soil. It is known that the agricultural life of irrigated soils is limited, but irrigation, however, offers unique opportunity for the distribution of fertilizers as very dilute solution, and also for the use of compounds not applicable except as dilute solutions. Ammonia (NH_3) and phosphoric acid (H_3PO_4) could hardly be applied separately in ordinary practice, but where irrigation is practiced either or both of these may be dissolved in the irrigation water and so distributed.

Shell Chemical Company has devoted considerable study to the application of ammonia to California agriculture and has achieved substantial success. The experimental work was begun in 1931, and by 1934 it was known that ammonia dissolved in irrigation water was a very efficient method for application of nitrogen. When ammonia is dissolved in irrigation water, the following reaction takes place:

$$Ca + HCO_3 + NH_3 = CaCO_3 + NH_4$$

and the ammonia is converted to ammonium ion to an extent determined by the calcium (resp. magnesium) concentration and of the bicarbonate concentration present in the water, and also, of course, by the amount of ammonia introduced. It would be possible so to limit the quantity of ammonia that practically all of it would be converted to ammonium ion, but this would lead to impractically low rates of application. There are many cases, however, where the water composition and rate of application are such that about 50 per cent. of the total NH_3 introduced is converted to ammonium ion.

The precipitation of calcium carbonate which accompanies the introduction of ammonia into irrigation water causes difficulty where pipe-lines are used. Fortunately a solution was found by the discovery of the property of exceedingly small concentrations of sodium hexametaphosphate inhibiting precipitation. Numerous cases are known where concentrations as low as 0.5 p.p.m. will slow up the precipitation rate so that no precipitate will be visible after three hours.

The interaction between dilute ammonia solution and soils is very complex. It is known that ammonia so fixed is capable of rapid nitrification, and, in fact, response of plants is in many cases so rapid as to lead to the suspicion that the ammonia is utilized directly. This phase of the practice is now the subject of special study at the Department of Agriculture of the University of California, and it is hoped that after a few years sufficient material will be at hand to make possible a separate report.

The use of pure ammonia is economically sound. From the manufacturer's standpoint the necessity of buying sulfuric acid and of making ammonium sulfate is avoided. From the farmer's standpoint the labor of hauling and application is avoided and uniform distribution assured.—Abstracted from paper by A. Rooseboom, to the Fifth International Technical and Chemical Congress of the Agricultural Industries.

Caustic Soda Production

Sodium hydroxide or solutions thereof are obtained by a process comprising the following steps: (1) the reaction between sodium chloride and barium hydroxide in aqueous medium at a temperature not exceeding 40° C. to form basic barium chloride which is removed from the reaction mixture; (2) the evaporation, with or without carbonation or sulfation, of the mother liquor from step (1), to remove as solids the remaining barium content and the sodium chloride. The reaction of step (1) may be conducted in an aqueous alcoholic medium, *e.g.*, a methanol-water mixture, or in an aqueous ammoniacal medium. The evaporation of step (2) may be followed by cooling, or flash evaporation may be employed, if desired, in several stages with intermediate removal of solids. The mother liquor from step (1) may be carbonated prior to evaporation, the resulting barium carbonate being calcined and returned to the process as oxide or hydroxide. Preferably at least a part of the basic barium chloride is worked up for return to the process mentioned in E. P. 464,834.

Separating Petroleum Emulsions

The separation of water-in-oil emulsions, such as are produced by oil wells, has been the subject of extensive investigation, and among the numerous methods proposed, the addition of chemical dehydration compounds seems to be most attractive. The following summary of an article "Chemical Methods for Separating Petroleum Emulsions" by Ir. G. W. Baron Van Dedem M. I., page 65, August 12, 1937, *Oil and Gas Journal,* lists his conclusions:

1. It is necessary to possess analysis of the edgewater of every separate drilling project in an oil field, indicating the quantities of carbonate, bicarbonate, weak organic acids, sulfate, the total hardness and the pH value.

2. It is necessary to know the titration curve and the pH value of optimum emulsion breaking effects of the dehydration compounds to be considered. This optimum value must be in line with the pH of the salt water.

3. For alkaline water with high pH, which ordinarily also contains little alkaline earth salts, the neutral soaps of oleic acid, solid fatty acids, liquid saturated fatty acids, linoleic acid, etc., depending upon the pH and the alkaline earth content of the salt water, should be applied.

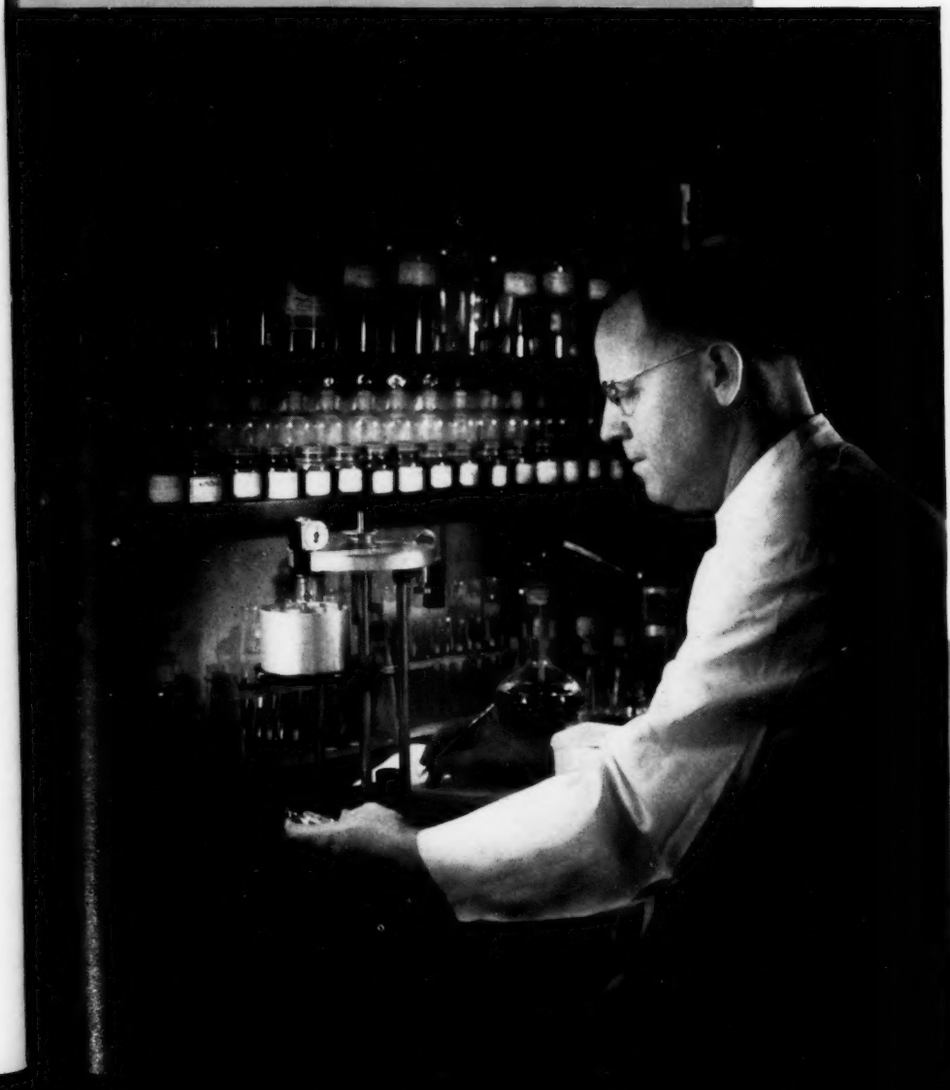
4. For alkaline water with lower pH, preferably buffered with bicarbonate, neutral or weakly acid ricinoleate, as pure as possible, has to be considered (eventually also other oxyacids, and perhaps also resin soaps). Instead of ricinoleate, either subjected to a purification process or not, often more economical results can be obtained with ordinary Turkey-red oil with the sulfonate group esterified and loosely linked.

5. For more acid water, one should consider the soaps of naphthenic acids, preferably having a low sulfate content, and the more stable fatty acid, alcoholic, or aromatic sulfonates and the petroleum sulfonates, having a higher sulfate content, provided these are adapted to the pH of the water, and do not contain antagonistic constituents.

CHEMICAL SPECIALTIES

HOUSEHOLD
INDUSTRIAL
AGRICULTURAL

- Glycerin Substitutes
- Wood Fillers
- Lacquer Raw Material
- Wax Paints
- Textile Auxiliaries
- New Names and New Goods
- Trade Marks and Patents



Testing stearates (see page 234) in the Mallinckrodt laboratories

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Glycerin Substitutes

By Edward Rosendahl

Glyco Products Company, Inc.

ACCORDING to the CHEMICAL INDUSTRIES GUIDEBOOK, about forty different industries use glycerin. This, of course, does not take into consideration the hundreds of specialized uses which in themselves do not account for large volume consumption, but which in the aggregate use considerable quantities of glycerin a year.

It is extremely interesting to study the diversity of uses to which this versatile product is put. From nitroglycerin to cosmetics, from tobacco to textiles, the list includes most of the major industries of the United States.

In 1936, almost 300 million pounds of glycerin were produced in the United States. In addition, over eleven million pounds were imported. This represents an increase of about twenty million pounds over the 1935 production and three million pounds in imports.

Although the use of glycerin is so wide-spread, it must not be forgotten that it is still in the nature of a by-product of the soap industry. In spite of the ever-growing demand for glycerin, its production is tied up with that of soap and consequently the amounts of glycerin available are dependent on soap production. In the case of most raw materials when consumption increases, additional plants are built, or existing plants are enlarged to take care of increased demands. Thus, if demands exceed supply for a little while, they are soon equalized and generally price reductions can be effected because of economies in larger production. However, the glycerin situation is entirely different in this respect. With a limit to the amount produced, increased demands cause a scarcity and consequent price increases.

This has been shown very graphically in the price fluctuations in the last few years. In 1935, there was only one-half cent per pound difference between the high and the low on C. P. glycerin but in 1936 there was five and one-half cents per pound difference in quoted figures between the high and the low. Actually, the difference is more in the nature of fifteen and a half cents per pound because, while the nominal high quotation was 21½c per lb. because of the scarcity, as much as 31½c per lb. was paid by purchasers who had to have the material at any price.

Such a situation, of course, could have only one possible result. Glycerin consumers immediately began searching for possible substitutes so that they could free themselves from the wide glycerin fluctuations and the difficulty of obtaining adequate supplies. Manufacturers soon stepped into the breach with glycerin substitutes of all kinds and the confused market became all the more confused. Many people were using glycerin because of its chemical properties, and while it is comparatively simple to duplicate a physical property, it is entirely different when a chemical reaction is necessary to obtain the desired results. The three largest markets for glycerin making use of the chemical nature of the material are the explosive field—for the production of nitroglycerin; the varnish trade—for the production of ester gum; and the synthetic resin and plastic field—for the production of the glyceryl phthalate resins. While diethylene glycol gives a nitrate somewhat similar in properties to nitroglycerin, the resins made with diethylene glycol and phthalic acid are considerably different from those made with glycerin. So, actually, these three markets were obliged to continue with glycerin irrespective of the price.

In the case of manufacturers who were using glycerin for its physical properties, a considerable amount of doubt arose as to exactly what property or properties of glycerin they were making use of in their particular products. Many manufacturers claimed that the most desirable feature of glycerin for their purpose was its hygroscopicity—the power of attracting and holding water. On investigation, however, it was found that hygroscopicity was not only unnecessary but was actually detrimental. The property they were really desirous of obtaining was that of "non-drying." As hygroscopicity and non-drying were so closely related in their minds, the two words appeared to be synonymous. In many cases, hygroscopicity was causing a considerable amount of trouble because of the difficulty of obtaining a constant product under varying conditions of humidity and temperature.

The manufacturer of glycerin substitutes, therefore, was confronted with a very serious problem. Recognizing the practical impossibility of producing a glycerin substitute which would have all the properties of glycerin, he was obliged to originate a series of such substitutes, each of which would, he hoped, have at least one important property of glycerin.

Perhaps at this point it might be advisable to tabulate some of the most important physical properties of glycerin which are utilized in industry today. The basic property of water-solubility is omitted as being common to all glycerin substitutes.

1. Non-drying
2. Hygroscopicity
3. Alcohol miscibility
4. Solvent powers
5. Preservative action
6. Sweet taste
7. "Body"
8. Lubricating Properties
9. Low freezing point
10. Non-toxicity (Edibility)

In addition to these properties, color and odor are very important to certain industries, such as cosmetics, foods, pharmaceuticals, etc.

It is obvious that no one user would require all the properties listed, although in certain special cases, a majority of such properties might be desirable. In the food and beverage industry, color, odor, taste and edibility are naturally of prime importance. In the case of flavors, the solvent power and alcohol solubility are the chief reasons for using glycerin, so that a substitute for this purpose must be colorless, odorless and edible. It must have a pleasant taste and be as strong a solvent for products, such as vanillin and coumarin, as glycerin is. On the other hand, solvent power and alcohol solubility are not important in other branches of the food industry. Thus, a tremendous amount of glycerin is used in shredded cocoanut. In this case, its sole function is to keep the cocoanut from drying out. In other cases, the substitute must have "body" so that the finished food product will have the same consistency as that made with glycerin.

In the cosmetic industry, taste is not an important factor but color and odor are. While the finished product is not to be eaten, it must be non-toxic and above all, non-irritating to the skin. In creams, such as shaving creams, tooth-pastes, etc., the substitute must be non-drying, whereas in hand lotions it must have the "smoothing" effect so noticeable in glycerin preparations. Because most tooth pastes and shaving creams are somewhat alkaline, the glycerin substitute marketed for this purpose must not break down or discolor in the presence of alkalies.

One of the largest uses of glycerin is in the tobacco industry. Its purpose here is primarily to keep the tobacco sufficiently

moist so that it does not dry out and powder. Of course, too much glycerin will prevent it from burning freely. Taste again is an important factor, but in this case, the substitute must not break down on burning to form poisonous, irritating, or otherwise unpleasant end products.

In the textile industry, glycerin has so many varied uses that it would be beyond the scope of this article to specify all of them. While color and odor are important in certain cases, in other uses they are only of secondary consideration. As a water-soluble lubricant, the glycerin substitute must be non-drying and non-sticky. In certain cases, it may have to be alkali resistant while in other cases acid resistance is a necessary property. Glycerin is used as a solvent for dyes, especially the coal-tar dyes. Thus a glycerin substitute sold for this purpose must have equal solvent properties in addition to any of the other properties specified.

In considering a glycerin substitute for the paper industry, the chief property required is that of "non-drying." Glycerin added to the paper pulp renders the finished stock soft and flexible. For light colored paper, it is necessary to have the substitute as light in color as glycerin.

Glycerin as a Lubricant

As a lubricating material, glycerin has certain advantages because of its properties. It does not harden or "gum" in contact with air, it does not thicken in cold weather and it does not attack such metals as copper and brass. These properties, therefore, must be considered in offering a glycerin substitute for lubricating purposes. The use of glycerin in connection with glue for the manufacture of printers rollers, flexible glues, etc., depends on the non-drying property of the glycerin. Certain substitutes which on the surface appear to be satisfactory eventually dry and the glue becomes brittle.

Very often it has been found that while a certain glycerin substitute does not replace glycerin completely for a particular use, it may partially replace the more expensive product, thus enabling certain economies to be made without interfering with the finished product. An interesting sidelight on the investigation of substitutes for glycerin has been that in certain cases some of these substitutes have basic advantages over glycerin which render their use more desirable than the product they have replaced. One such substitute is non-drying but also non-hygroscopic. This means that its consistency remains the same, it does not become thinner in the summer and heavier in the winter due to absorption and loss of water. Thus, when used as a lubricant, it stays "put" and does not tend to flow in the hot humid days of summer.

From the preceding illustrations, it can be seen that in offering a substitute for glycerin, the manufacturer must have some knowledge of the particular properties desired and a general idea of the purpose to which the material is to be put. It is not idle curiosity when the supplier asks the prospective customer for as complete information as it is possible for him to give. In order to supply a product which has a reasonable chance of success this information is really necessary.

Phenolate Process for Soap

Production of soaps without the use of caustic soda or soda ash has been patented by Prof. Joachim Leimdörfer, of Budapest. He saponifies a suitable fat or mixture of fats with milk of lime, and decomposes the lime soap formed by boiling with sodium phenolate. The neutral soda soap produced is separated from the lyes and further worked up, while the lyes containing calcium phenolate are treated with sodium bisulfate for the recovery of sodium phenolate. *Chem. Trade Journal.*

Resin and Paraffin Wax Emulsions

Aqueous emulsions of resin and paraffin wax, said to be suitable (*inter alia*) for giving a waterproof coating to textile yarns and fabrics, noted in E. P. 463,187, are made by using as the dispersion medium an aqueous alkaline solution and heating together resin and wax in presence of water, but in absence of protective colloids or alcohols of high molecular weight, so that they are softened and melted respectively to form a complex, or they are intimately associated and the complex is afterwards dispersed by boiling with an aqueous solution of alkali hydroxide or carbonate, without agitation by any other means.

Example 1.—In an ordinary boiling vessel containing 15 gals. water, 15 lbs. caustic soda are dissolved by heating with direct steam. 180 lbs. resin together with 20 lbs. paraffin wax are added to the hot alkaline solution and the whole mass is boiled until emulsification has taken place. The concentrated hot emulsion is then diluted with warm water in any desired proportion.

Example 2.—20 gals. water, 200 lbs. resin and 200 lbs. paraffin wax are placed in a boiling vessel fitted with a steam jacket and boiled under a pressure of 15 lbs. per sq. in. in the jacket. When the mass is melted and homogeneous, 20 gals. hot water in which 16 lbs. of soda ash have been dissolved are slowly poured into the mass and mixed with it while boiling is continued. When emulsification has taken place a further 120 gallons of warm water are mixed with the concentrated emulsion to dilute it.

De-lusterizing Material

Damaflex, a flexible de-lusterizer which produces rich figured damask effects without stiffening or changing feel of the fabric, is being manufactured by Roxalin Flexible Lacquer Co. Its use in printing produces a simulation of the single damask weave, retaining the highlights and subdued effects of the genuine loomed fabric. A valuable feature is that it is washable with neutral soap, withstands dry cleaning, and is unaffected by ironing.

Manufacture Wax Paints

According to one process for the manufacture of wax paint, wax, resin and linseed are fluxed together and diluted with turpentine or mineral spirits to brushing consistency. Pigments are ground into this vehicle and toned with soluble dyes if necessary. Other suggestions are to incorporate pigments directly in molten wax and to prevent solidification of mixture by addition of alcohol. Aside from the difficulties encountered in the manufacture of such paints, they were difficult to use, lacked hiding power and weather resistance. Due to the peculiar nature of these mixtures separation of the pigment and binder may occur and cause the defects mentioned. To obtain a more uniform film it has been proposed to smooth the film with electrically heated tools, a method unsuitable for exterior use because of the great expense involved. The heat applied frequently results in color changes, and the resultant films lack adhesion because resins and similar ingredients are absent.

An improved method for the manufacture of wax paints has recently been patented by Josef Deis (Germ. Pat. 644,409) who claims to have corrected these defects. According to this invention 70 parts zinc oxide, for example, are mixed with a melt consisting of 36 parts resin and 24 parts paraffin. The mixture is cooled and broken up, dissolved in turpentine or any other suitable solvent and ground finely. If a fine pigment is used, the grinding process will require little effort. The pigment is said to be thoroughly treated with resin and wax, and dispersed in the solvent. If this mixture is thinned with a slightly volatile solvent, a paint of high hiding power which leaves smooth and uniform films is obtained. The resultant film is said to be hard and affords sufficient protection.—*Paint, Oil & Chemical Review*, Aug. 5, '37, p. 8.

Wood Fillers

Some Uses and Formulas

By Charles F. Mason, Ph.D.

THE term "wood fillers" will be used here to cover a group of commercial preparations, being sold under trade names such as Plastic Wood, Wood Caulking Compounds and Wood Floor Fillers. Although the prefix wood is usually used this does not imply that they are useful only upon such surfaces because they are compounded to make tight bonds with metals, stone, brick and concrete. This class of compounds has a constantly increasing field of use especially in modern buildings where the tendency is to provide larger window space.

The exposed panes of glass can be made air-tight very easily by puttying the exposed joints but the space between the steel frame and the wall is exposed to constant vibration and to keep it air-tight caulking compounds are used. These compounds consist of an organic binder of the varnish or lacquer base and an inert filler. They are applied either with a trowel or a hand operated cylindrical piston pump which is provided with a wing type nozzle, and difficultly accessible openings can be filled.

They are sold in different degrees of fluidity or can be thinned at the point of use to fit different conditions. To date their only drawback is that the coefficient of expansion with changing temperatures has been overlooked and broken window panes have resulted; especially in skylights.

Wood floor fillers are used upon rescraped hardwood floors to fill crevices between the sections and in extreme cases to fill unevenness in the boards themselves before painting or varnishing. They are experiencing a decreasing consumption for many reasons, one of which is that the modern tendency to varnish or shellac a floor with a transparent coating leaves the filler exposed to view; a condition which did not exist when painting was more prevalent.

In the formulas listed below are included some specialty fillers for use upon furniture and novelties for filling cracks and crevices but their consumption is obviously small.

Caulking Compounds

1.	Benzol	35.00	3.	Zinc Oxide	15.00
	Turpentine	2.00		Manganese Borate	0.25
	Diatomaceous Earth	15.00		Iron Oxide	4.75
	Varnish	25.00		Tung Oil (Treated)	20.00
	Silica	12.00		Sulfurized Fish Oil	20.00
	Talc	11.00		Gloss Oil	20.00
				Asbestos (Fibers)	20.00
2.	Water	44.00			
	Salt	2.50	4.	Glycerine 95%	25.00
	Oil of Sassafras	0.50		Water	15.00
	Glycerol	0.50		Lead Oxide	50.00
	Gypsum	40.00		Fuller's Earth	10.00
	Dextrin	9.00			
	White Lead	3.50	5.	Shellac	20.00
				Alcohol 95%	30.00
				Whiting	50.00

Wood Floor Fillers

1.	Casein	5.00	2.	Sawdust	60.00
	Starch	5.00		Oil Varnish	30.00
	Sodium Carbonate	1.00		Asbestine	10.00
	Water	50.00			
	Silica	39.00	3.	Zinc White	50.00
				Lead Oxide	40.00
				Shellac	5.00
				Alcohol	5.00

Specialty Fillers

1.	Collodion	25.00	2.	Rubber (White Crepe)	15.00
	Spirit Varnish	50.00		Rosin	10.00
	Castor Oil	5.00		Naphtha (Petroleum)	25.00
	Ether	20.00		Wood Flour	50.00

Plastic Woods

1.	Lead Oxide	1.00	3.	Talc	65.00
	Whiting	34.00		Copal Gum (Manila)	15.00
	Silex	6.00		Alcohol	20.00
	Wood Flour	9.00			
	Nitrocellulose (in alcohol)	50.00	4.	Celluloid	24.00
2.	Nitrocellulose	15.00		Shellac	12.00
	Ester Gum	7.00		Rosin	10.00
	Castor Oil	4.00		Alcohol	16.00
	Alcohol	50.00		Acetone	20.00
	Wood Flour	24.00		Wood Alcohol	18.00

It is obvious that after consideration of the five formulas under Caulking Compounds the components must be mixed in a grinder of the pebble mill or burr mill type; otherwise a smooth product is impossible and loss of solvent is expensive and dangerous. In formula two the dextrin should be dispersed in the water before adding the fillers and deodorizers. In formula three the tung oil is treated by melting five pounds of limed rosin or ester gum, then the oil (15 lbs.). Continue the heating at about 425° F. for two hours. The drier (manganese borate) can then be added, followed by the other binders and fillers.

In formula five the shellac should be first dissolved in the alcohol with constant stirring until a smooth varnish is obtained or a five pound cut of shellac varnish sold in the open market can be used.

Under Plastic Wood two formulas contain nitrocellulose and one contains Celluloid both of which are highly inflammable and the usual care should be exercised in their use. At least one hour should be allowed to elapse before overlying paint or varnish films are applied or otherwise locked vapors from the drying of the plastic would later escape and cause blisters.

Formula one under Wood Floor Fillers contains water and water soluble substances; a condition which requires a long time of drying and a durable overlying protective coating before water is brought into contact with the floor. Formulas two and three which have a varnish base are often preferred.

Under Specialty Fillers, formula two has found use as a caulking compound in crevices which are exposed to severe vibration. It is obvious that after evaporation of the solvent a layer of wood flour bound by rubber and rosin remains. This is very flexible but tacky and any exposed portions should have a protective coating of varnish or lacquer to prevent the troubles of collecting dust, etc.

Although the portions are listed here by weight, the ratio of binder to filler can be varied within wide limits without endangering the usefulness of the product. This is often done for large users who desire different fluidities for ease of application in certain cases. They can be packaged in the usual paint and varnish containers readily purchasable upon the market, and it is surprising that more producers of these products have not adopted them because they come under the class of paint and varnish specialties.

However they are made largely by specialty producers whose methods of advertising have not yet reached the public at large.

New Glazed Cotton Fabric

Cubaleen, a cotton fabric with a bright glazed finish that will not disappear under washing, and which is regarded abroad as a successor to glazed chintz, is being manufactured by Turnbull and Stockdale, Ltd., Manchester, England.

New Ideas in the Specialties Field

Lacquer Raw Material

Ethyl cellulose, providing its degree of ethylation is high enough, has properties which make it a valuable lacquer raw material. In the ethyl cellulose offered commercially in this country from two to three of the available alcohol groups are etherified. The degree of etherification controls such important properties as water resistance, solubility in organic solvents and thermoplastic characteristics.

Ethyl cellulose has low flammability, a property which increases its value as a raw material for protective finishes and molding compounds. Its high transparency to light, especially ultra violet light, makes it particularly resistant to discoloration on exposure to sunlight. It is very resistant to weak alkalis and acids and is compatible with a great many other raw materials such as waxes, resins and plasticizers. Specific gravity is 1.14, which means that it bulks more than cellulose nitrate and acetate, hence covering a larger area per given weight of material. Its tolerance for petroleum thinners and solubility in a wide variety of low-priced aromatic hydrocarbons make it an especially valuable ingredient in protective coatings of all kinds. One of the best solvent combinations for ethyl cellulose consists of 80 per cent. toluol and 20 per cent. ethyl alcohol by volume. One advantage over other similar binding media lies in the fact that the alcohol used in this solvent mixture need not be anhydrous. The small amount of water introduced through the alcohol is insufficient to cause orange peel. By the same token, the blush resistance of ethyl cellulose is very good.

Two characteristics which have determined one of the important applications of ethyl cellulose are its low softening point and thermoplasticity. Pigments may be readily incorporated and dispersed in ethyl cellulose with the aid of differential rolls or mixers of the Banbury type. Its chemical inertness makes it compatible even with the most reactive pigments. Still, it has exceptional wetting characteristics, which coupled with its thermoplastic properties aid in the dispersion of the pigment particles with a minimum amount of grinding. Pigmented chips may be prepared with ethyl cellulose which upon solution in a suitable solvent or solvent mixture yield lacquers of a very superior texture.

Cellulose Ethyl Ether Films

The flexibility of cellulose ethyl ether films is so great that it is affected only slightly by plasticizers. The chief effect of the addition of plasticizers is a softening of the film. The maximum increase in flexibility is usually obtained with a plasticizer content of about 15 per cent. on the basis of the ethyl cellulose present. Beyond this concentration of plasticizer the softening effect becomes unduly great and percentages above 15 per cent. should be avoided. The one exception to this rule is castor oil which continues to increase the flexibility of cellulose ethyl ether films up to very high concentrations. Diphenyl phthalate and Dow plasticizer No. 5 produce a similar effect but give much harder films. Exceptionally soft films are produced through the use of n-butyl stearate which is a non-solvent for ethyl cellulose. One of the outstanding properties of ethyl cellulose is its ability to impart its unusual flexibility to resins and yield films which can be flexed and creased without breaking. It may be incorporated in varnishes with which it is compatible either during the cooking stage or dissolved in the thinner. The combinations obtained dry faster and to a more tackfree film than the varnishes alone, and yield films of greater toughness and flexibility.—*Paint, Oil & Chemical Review*, May 13, '37, p. 24.

Textile Auxiliaries

Di- or tri-alkylene glycol ether chains derived from alkylene glycols containing < 5 carbon atoms are introduced into cycloaliphatic or aliphatic alcohols containing at least 6 carbon atoms, or their mineral acid salts, e.g., dodecylsodium sulfate and triethylene glycol yield dodecyltriethylene glycol ether. Resulting products may be subsequently treated with sulfonating or phosphating agents.—E. P. 463, 624.

Printing Lacquer for Textiles

Flex-tex, new printing lacquer for silks, taffetas, rayons, cottons, and acetates printed in all colors by stencilling, engraved roller and silk screen methods, is a product of Roxalin Flexible Lacquer Co., use of which retains original softness of textiles without loss of feel or texture. Product seems to have wide possibilities of application.

Emulsifying and Thickening Agent

An emulsifying agent free from alkalis, soaps, amines and inorganic salts is often desirable in the manufacture of emulsions of oils and waxes. Glycoride (glycol glyceryl stearate) is an emulsifying and thickening agent which successfully meets these conditions. Glyco Products, manufacturer, states it is a light colored, wax-like solid which readily disperses in hot water forming, on cooling, stable fluid or paste emulsions according to concentration. A one per cent. dispersion in water has a pH of 5.9, and emulsions so made have a pH of 6.4, provided no alkali producing materials are added. Paste emulsions made from it withstand freezing considerably and in most cases even when frozen can be restored to their original state by warming gently. It is useful in the manufacture of polishes, textile emulsions, cosmetics and for all types of emulsions where freedom from alkalinity, soaps and inorganic salts is an important factor.

Dielectric Enamel

A black enamel, with special dielectric properties, suitable for finishing electrical apparatus, has been developed by Maas & Waldstein, Newark, N. J. New enamel dries to a rubber finish, and is tough, durable, and has high electrical resistance. It is applied by spraying and a switchboard panel that has been marred or defaced can be easily refinished without dismantling by spraying on another coat.

Sulphonium Compounds in Disinfectants

Disinfectant and fungicidal preparations comprise a mixture of two or more sulphonium compounds. The disinfectant agents may be used for the preservation of preparations containing proteins or starch, or for the preservation of cosmetics. Compounds containing radicals derived from fatty acids or alcohols of from 10 to 20 carbon atoms are particularly suitable, *e.g.*, dodecyl-benzyl-methyl-sulphonium methosulfate obtainable from dodecyl-benzyl-thioether and dimethyl sulfate and the corresponding tetradecyl, cetyl or octadecyl derivatives. Examples describe the disinfection of a solution of proteins, the preparation of an ointment having a petroleum jelly base and the preparation of aqueous disinfectant solutions, the active ingredients in each case being mixtures of sulphonium compounds having long chain alkyl radicals and, in addition, radicals such as methyl, phenyl, benzyl, tolyl.—E. P. 464, 330.

Stain Solvent

Absolute Stain Solvent, product of Woodfinishing Products Co., 44 Industrial St., New York City, is an anhydrous solvent used to obtain quick-drying, non-grain-raising, non-bleeding wood stains.

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Solvent Degreasing Metal

To remove grease, oil, abrasive, tripoli, lime, rouge, etc., from parts and finished articles after they have been machined, blanked, stamped, formed, threaded, ground, polished, cut down, colored or glossed, before being pickled, descaled, sandblasted, electro-plated, lacquered, etc., is not an easy task. Solvent degreasing has been and will continue to be a great help. Its methods of application are rapidly being increased and constantly improved. Its principles are correct for its purpose and it is positive and practical in its application.

The successful solvents are chlorinated hydrocarbons which must be stabilized, inhibited, non-explosive, not inflammable, and do not hydrolyze with water; they have a low and constant boiling point (boiling at about 190° F.); are easily separated from greases, etc.; can be used over and over again indefinitely; have penetrating vapors almost five times as heavy as air; and will not oxidize or corrode metal. These solvents are made under many trade names but to the layman they are practically the same.

The only consumption of the solvent is that which is lost by vapor or evaporation. Machines can be equipped with distills so that the solvent is constantly being distilled, which removes the solids and oil contamination. There is also incorporated a separator for removing water from the solvent. If the still and separator are not a part of the machine, they can be purchased as separate units of equipment. Solvent is not discarded when dirty or contaminated, but is cleaned and used over and over again.

Many prospective customers make the mistake of confusing the degreasing solvent with ordinary petroleum solvents such as benzine, naphtha and gasoline.

Articles to be lacquered, enameled, varnished, painted, or coated with other organic coverings do not have to be subsequently cleaned in an alkaline cleaner, but can have the coating applied directly after being degreased—and this is in spite of a fine film of inorganic material on the surface. However, this is not the procedure to follow if the articles are to be electro-plated, although some platers claim they are getting good results by plating directly after degreasing. Not many agree that this is the right procedure to follow. They seem to think that it is still necessary to also clean in "potash" or an alkaline cleaner; but it is not necessary to allow the work to remain in the cleaner to "soak," which was formerly a part of the process. An immersion rinse may be all that is required, but a 10-second cleaning with electric current is usually preferred.

Even manufacturers of machines and solvents recommend the immersion rinse in an alkaline cleaner before electro-plating. The cost and time it takes to perform this operation is very small, and we all know that the cleaner the surface is for an electro-plate the better the final results. Abstracted from article by Charles W. Hardy, *Industrial Finishing*, August, 1937, p. 31.

Treatment Concrete with Alkali Silicates

Processes for the impermeabilization of cement and concrete by treatment with sodium silicate solutions are capable of much wider adoption in the opinion of M. Albert Debecq, *L' Industrie Chimique Belge*, August, 1937.

The theory, at one time widely held, that the action of sodium silicate on concrete was due to the formation of insoluble silicate of lime, no longer finds favor, the prevailing view being that the *modus operandi* of the treatment is the deposition of silica within the pores of the concrete. It is now accepted that the silicate plays the part of a mineral glue, cementing together the different elements of the concrete and forming a solid monolith.

Successful results are only obtained if the sodium silicate used is such that the ratio of Na_2O to SiO_2 is at least three to one, while its content in free alkali should be lower than 0.57 per cent. of NaOH. Use of a more basic silicate gives rise to inclusions of hydrated sodium carbonate, which diminish considerably the strength of the concrete. The water of dilution should be as pure as possible and quite free from acid or clayey material. The temperature at which the treatment is carried out is also of importance, and it has been found that mineral dusts activate the silicate hardening, while organic dusts retard it. The first phase in the hardening process corresponds to the separation of gelatinous silica and the formation of hydrated sodium carbonate. The second, or actual, hardening stage commences as soon as the colloidal silica partially combines with the soda to form new silicate of soda.

There are two different methods by which treatment can be carried out. In the first, the silicate is added to the gauging water. This process speeds up the setting of the cement very considerably. If, for instance, 20 grammes of silicate are employed per ton of cement, the latter sets three times as rapidly as without silicate. This method consequently offers great advantages for cement work under water and where time is of great importance. Its drawback is that the final strength of the cement is somewhat reduced.

In the second and more usual method, the silicate is added after the first set of the cement. This second method leads to increase in the mechanical strength, chemical resistance, and compactness of the cement. Practical trials recently carried out on concrete paving have shown that the method can be effectively conducted by applying three successive coatings of neutral sodium silicate solution of concentrations 10°, 20°, and 38° Bé. respectively. Paving so treated stands up successfully to very heavy traffic.

Sulfite Lye in Fruit Sprays

Sulfite lye as an emulsifier in insecticides has been the subject of tests at Long Ashton Research Station (*Chemical Age*, Aug. 7, '37), where it is stated that sulfite lye emulsions would permit far greater use to be made of fruit spray washes than is possible with the petroleum oil preparations now used. New experiments will be conducted.

Sheep Dips

Research on problems connected with the sheep maggot fly, conducted at Aberdeen University and North of Scotland College of Agriculture, reveal that of various methods tested, the use of oily emulsion has been found best, product finally adopted having the composition: Water-white mineral oil, 38 parts by weight; pale straw-colored 99 per cent. cresylic acid, 25; paradichlorobenzene, 25; and crude brown Yorkshire wool grease, 12. Since it is almost impossible to obtain complete prevention of strike, a certain number of sheep will always require treatment for maggot infection. The following effective dressing was evolved: Water-white mineral oil, as specified, 71 per cent.; cresylic acid, water-white, 4 per cent.; Yorkshire wool grease, 10 per cent.; paradichlorobenzene, 5 per cent.; and oleum picis (rectified), 10 per cent. *Chemical Trade Journal.*

Latexed and Heat Resistant Cords

Two new tire cords, named "Heat Resistant Cords" and "Latexed Cords," have been developed by Bibb Mfg. Co., Macon, Ga. It is claimed that these cords not only produce a tire showing a minimum of growth, but at the same time resist the effects of high temperatures to a degree never before approached in any cord fabric. The outstanding features of these new cords are low stretch, low gauge, high break, high recovery value, increased safety and added mileage. Particular attention is directed to the unusually high bone dry break value as compared with tests under normal conditions.

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Chemical Specialty Patents

Impregnation of articles by centrifugal means. No. 20,444. Reissue. Wm. A. Hyde to Leon J. Barrett, both of Worcester, Mass.

Composite article comprising aluminum member intimately associated and in surface contact with a magnesium oxychloride cement body containing a soluble dichromate. No. 2,086,525. James Robert Akers, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Apparatus for revivifying spent decolorizing materials. No. 2,086,561. Carl G. Koeppl, one-half to Anthony Wm. Deller, both of New York City.

Production bituminous paving mixtures. No. 2,086,581. Preston R. Smith, Rahway, N. J., to Barber Co., Inc., Phila., Pa.

Manufacture ketenes from organic compounds. No. 2,086,582. Karl T. Steik, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Preparation sulfonation products of acylated amines. No. 2,086,690. Werner Zerweck, Frankfort-am-Main-Fechenheim, and Eduard Gofferje, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production amino compounds of the quinoline series. No. 2,086,691. Werner Zerweck and Wilhelm Kunze, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Method waterproofing textiles, felts, etc., by application of a volatile fluid vehicle in which is dispersed a stable, non-sweating mixture containing a viscous, refined petroleum oil, a blend of ceresin wax, and a material of the group of paraffin wax and solid fatty acids. No. 2,086,792. Constantine F. Fabian, Brookfield, Conn., and Alexander N. Sachanen, Luxembourg, Luxembourg, to Non-Mercuric Carrot Co., Danbury, Conn.,

Composition for waterproofing textiles, felts, leathers, etc., comprised of a stable, non-sweating mixture containing a sulfurated blend of ceresin wax and paraffin wax, and a sulfurated viscous refined petroleum oil. No. 2,086,793. Constantine F. Fabian, Brookfield, Conn., and Alexander F. Sachanen, Luxembourg, Luxembourg, to Non-Mercuric Carrot Co., Danbury, Conn.

Purification of the isatins. No. 2,086,805. Robert C. Hoare, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Condensation products from alcohols and phenols, by heating with zinc chloride. No. 2,086,810. Herbert Langwell, Windmill End, Epsom, and Ernest Edward Connolly, East Park, Hull, England.

Production asymmetrical thiourea derivatives. No. 2,086,822. Max Schubert and Karl Schutz, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Ceramic composition; bonding agent for refractories, consisting of mixture containing aluminum oxide with arsenic compounds. No. 2,086,828. Johan Bertil, Stalhane, Stockholm, Sweden.

Preparation anthraquinone acridine carbazoles. No. 2,086,843. Wilhelm Bauer, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., New York City.

Process laundering goods in presence of iron, aluminum, or copper, immersing goods in an alkaline solution containing an alkali-metal hexametaphosphate together with a water-soluble compound containing an acid radical which prevents deposition of the metals in the goods by the alkaline water. No. 2,086,867. Ralph E. Hall, Mt. Lebanon, Pa., to Hall Labs., Inc., Pittsburgh, Pa.

Hard, high melting point driving journal compound consisting of soda soap and a heavy viscous mineral oil, soap containing sodium palmitate. No. 2,086,870. Wm. P. Hilliker, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Production dicalcium phosphate and ammonium phosphate. No. 2,086,912. Oscar Kaselitz, Berlin, Germany.

Preservation green hides and skins by impregnation with a water soluble salt of barium. No. 2,086,920. Arthur C. Moore, Maplewood, N. J.

Bituminous composition for coating mineral aggregate; comprising asphalt, petroleum naphtha, kerosene, and tar naphtha. No. 2,086,968. Hiram M. Stafford, Chicago, Ill., to Sealdrok Co. of New England, corp. of Mass.

Preparation a diazo compound from a diazotizable primary aromatic amine. No. 2,086,986. Wendell W. Moyer, Syracuse, N. Y., to Solvay Process Co., New York City.

Fluid adapted for printing out and printing on textiles, comprising hydrosulfite, pigment, and a reactive pigment composition containing animal glue and a phenol-aldehyde reaction product. No. 2,087,000. Mortimer T. Harvey, East Orange, N. J., to Harvel Corp., corp. of N. J.

Production a product suitable for use as wrapping tissue and comprising a cellulosic sheet base and surface coating. No. 2,087,013. Dorothy E. Bateman, Buffalo, N. Y., to du Pont, Wilmington, Del.

Stable and readily water soluble insecticide consisting of a pine oil solution of oleo-resin of pyrethrum and a substantially free alkali vegetable soap. No. 2,087,028. Chas. B. Gnadinger, Minneapolis, Minn.

Anti-freeze solution, comprising a volatile water-soluble aliphatic alcohol having incorporated therein an evaporation retarder. No. 2,087,098. Louis Spiegler, Woodbury, and Chas. J. Pedersen, Penns Grove, N. J., to du Pont, Wilmington, Del.

Non-corrosive anti-freeze solution, comprising a volatile water-soluble alcohol having incorporated therein a corrosion inhibitor. No. 2,087,103. Fred B. Downing, Carneys Point, and Chas. J. Pedersen, Penns Grove, N. J., to du Pont, Wilmington, Del.

Insulating and sound deadening sheet; comprising foundation of sponge rubber. No. 2,087,248. Albert C. Fischer, Chicago, Ill.

Manufacture soaps, having controlled alkalinity, by cold processing, and having a pink color when moistened with phenol-phthalein solution; using beef tallow, cocoanut oil, hydrogen peroxide solution, caustic soda solution, and an alkaline aqueous solution of silicate in process. No. 2,087,267. Julius Schaal, New York City.

Adhesive containing chlorinated rubber, resins, plasticizers, and waxes. No. 2,087,337. Wm. J. Tomsicek and Jose B. Calva, St. Paul, Minn., and Lloyd L. Dodge, Rhinelander, Wis., Tomsicek and Calva assignors of their right to Dodge Chemical & Mfg. Co., Chicago, Ill.

Production stable emulsion of coal tar and asphalt flux oil, disperse phase of emulsion containing predominant amount of coal tar. No. 2,087,400. Wm. Francis Fair, Jr., West New York, N. J., to Barrett Co., New York City.

Production stable emulsion, disperse phase of which contains tar of the group of coal tar and water gas and a small amount of asphaltic bitumen, and the continuous phase contains an aqueous medium and an emulsifying agent. No. 2,087,401. Wm. F. Fair, Jr., to Barrett Co., both of New York City.

Dry powder metal polish composition consisting of a water soluble ammonium salt, water soluble soap, a finely divided inorganic abrasive material, and a colloidal suspension agent of the nature of colloidal clay. No. 2,087,427. Frank M. Biffen, Ridgefield Park, N. J., to Foster D. Snell, Inc., Brooklyn, N. Y.

Patents digested include issues of the "Patent Gazette," July 13 through August 10 inclusive.

Antiseptic and germicidal compositions prepared by treating casein with a phenol in neutral aqueous medium at approx. 75°C. No. 2,087,588. Wm. E. Austin, N. Y. City.

Insecticide emulsion, including water, an oil, a preservative, and finely powdered natural parts of a plant from the group of derris and cube root, containing an inherent emulsifier and properties toxic to insects. No. 2,087,599. Edw. B. Hunn, Cranford, N. J., to Stanco, Inc., corp. of Del.

Binding agent for road construction; comprising tar and incorporated therewith a chlorinated polyvinyl chloride. No. 2,087,614. Ernst Burgin, Bitterfeld, Germany, to I. G., Frankfort-am-Main, Germany.

Method treating soap under vacuum. No. 2,087,788. Adolph F. Thal, Elmhurst, Ill.

Tanning preparation comprising tannin-bearing extracts and sodium metaphosphate. No. 2,087,849. John Arthur Wilson, Milwaukee, Wis., to Monsanto Chemical Co., St. Louis, Mo.

Cork composition comprising cork granules and a binder including a resin, bodied tung oil, and polymerized chlorobutadiene. No. 2,087,942. Wm. M. West to Crown Cork & Seal Co., Inc., both of Balto., Md.

Production ink consisting of reactive products of gallic acid, ferrous sulfate, heptahydrate, and tartaric acid, a coloring material, and water. No. 2,088,006. Elmer W. Zimmerman, Chevy Chase, Md., to Government of the U. S.

Detergent and emulsifying composition comprising a solution of a water-soluble sulfuric acid ester of a saturated secondary branched-chain monohydric aliphatic alcohol. No. 2,088,020. Jacob N. Wickert, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Metal primer. No. 2,088,140. Leo Rosenthal, Leverkusen-Wiesdorf, Wilhelm Becker, Cologne-Mulheim, and Reinhard Hebermehl, Cologne-Deutz, Germany, to I. G., Frankfort-am-Main, Germany.

Detergent in form of molded pieces, comprising sulfonates of a mixture of oleyl alcohol and saturated alcohol. No. 2,088,308. Walther Schrauth, Berlin-Dahlem, Germany, to "Unichem" Chemikalien Handels A.-G., Switzerland.

Manufacture stable lubricant, comprising preparing anhydrous soap by heating to reaction temperature, a non-aqueous mixture consisting of alkali, a glyceride oil, and an alkyl ether of diethylene glycol, cooling, and adding a mineral lubricating oil to reaction products. No. 2,088,452. Irving R. Valentine, Erie, Pa., to General Electric Co., Schenectady, N. Y.

Deflocculant, applicable to water-dispersed paper-fibers, consisting of derivative of gum karaya. No. 2,088,479. Thos. R. Le Compte, Pittsburgh, Pa., to John A. Manning Paper Co., Inc., Green Island, N. Y.

Adhesive composition containing a soluble polymer of an alpha beta-unsaturated ketone. No. 2,088,577. Rollin F. Conaway to du Pont, both of Wilmington, Del.

Insecticide comprising an arsenate and potassium-aluminum sulfate. No. 2,088,639. Wm. McIlvaine Dickson, Woodside, Del., and Arthur H. Henninger, St. Albans, N. Y., to General Chemical Co., N. Y. City.

Insecticide comprising dry, unreacted mixture containing lead arsenate and a substance of the group of quassia and aloes. No. 2,088,640. Wm. McIlvaine Dickson, Woodside, Del., and Arthur H. Henninger, Floral Park, N. Y., to General Chemical Co., New York City.

Method controlling codling moth infestation, using insecticide comprising a stomach poison and an astringent ingredient. No. 2,088,641. Wm. McIlvaine Dickson, Woodside, Del., and Arthur H. Henninger, St. Albans, N. Y., to General Chemical Co., N. Y. City.

Insecticide comprising a water insoluble arsenate having incorporated therewith a dispersing agent consisting of a water soluble dye. No. 2,088,651. Arthur H. Henninger, St. Albans, N. Y., to General Chemical Co., New York City.

Dielectric composition consisting of a liquid mixture of nitrobenzol and chlorinated diphenyl. No. 2,088,693. Wm. Dubilier, New Rochelle, N. Y., to Cornell-Dubilier Corp., New York City.

Production non-slippery, self-lustering floor wax suspension, comprising emulsion of hard floor wax in water, an aqueous dispersion of vulcanized rubber, and a water-soluble emulsifying agent. No. 2,088,795. Bernard L. Kline, Manhasset, N. Y., to Western Union Telegraph Co., New York City.

Asbestos yarn. No. 2,089,021. Boutwell H. Foster, Maplewood, N. J., to U. S. Rubber Products, Inc., New York City.

Aqueous sizing compound for application of metal foil under heat and pressure to fabrics having moistureproof coatings. No. 2,089,063. Geo. P. Johnson to Rademaekers Marvel Size Co., both of Newark, N. J.

Soldering flux comprising formamide and a metallic salt. No. 2,089,095. Paul La Frome Magill, Ransomville, N. Y., to du Pont, Wilmington, Del.

Liquid soap having approx. 40% fatty acid content. No. 2,089,305. Kurt Stickdorn, Rosslau/Anhalt, Germany.

Manufacture sandpaper and the like, using an adhesive comprising asbestos cement, zinc oxide, sodium silicate, and water. No. 2,089,426. Thos. M. Richmond to Modern Engineers, Inc., both of Chicago, Ill.

Impression material comprising an aqueous organic hydrocolloid gel base and a plaster-hardening agent. No. 2,089,552. Lawrence E. Harrison, Prescott, Ariz., to Oramald Products Corp., West Hollywood, Calif.

Resist for use in etching glass; composition being in form of a pasty mass consisting of rosin, beeswax, paraffin wax, asphalt, pigment, varnish, turpentine, fat, and a drier. No. 2,089,571. Floryan Polasik, one-half to Casimir S. Wiczas, Chicago, Ill.

Plant fungicide containing copper oxychloride, a protective colloid and water. No. 2,089,612. Paul Kubelka, Prague, Czechoslovakia.

Asphalt composition comprising a silicious mineral aggregate and bitumen having high resistance to the deteriorating action of water. No. 2,089,713. Reyerus Nicolaas Jan Saal, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Pressureproof insulating bodies, especially for electrolytic cells. No. 2,089,752. Otto Lang, Munich, Germany.

Improved insecticidal solution comprising a light petroleum distillate and rotenone held in solution by an addition of a glycol derivative. No. 2,089,766. Wm. A. Simanton to Gulf Research & Development Co., both of Pittsburgh, Pa.

Insect repellent; petroleum fraction containing a substance selected from the class of diethylene glycol monobutyl ether and diethylene glycol monoethyl ether acetate. No. 2,089,767. Wm. A. Simanton to Gulf Research & Development Co., both of Pittsburgh, Pa.

Stable foam producing agent, for use in producing porous concrete, etc., comprising condensation product of an aldehyde and a phenol in combination with hydrated oxide of a metal of the group of aluminum, chromium and titanium. No. 2,089,813. John A. Rice, Berkeley, Calif.

Cleaning compound for metal surfaces; comprising organic sulfonic acid, water, and a solvent for grease. No. 2,083,013. Michael W. Freeman, Detroit, Mich.

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SOLVENT NEWS

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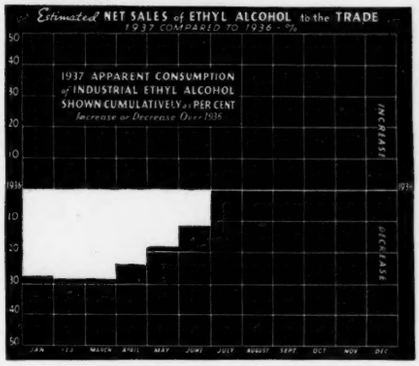
SEPTEMBER ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1937



Apparent consumption of industrial ethyl alcohol from Jan. 1 to June 30, 1937, was 26,751,000 wine gallons. This is 11.5 per cent less than during the same period in 1936 when 29,862,000 wine gallons were consumed.

BLAZE PREVENTED BY FIRE-PROOFING PAINT

Complete fire-proofing is claimed for paint made with a new flame-proofing ingredient. At a recent demonstration in Detroit, two test buildings were erected and their exteriors set afire. According to reports, one building, painted with ordinary paint, was completely destroyed, while the other, painted with the new mixture, failed to burn. The inventor of the ingredient states that it mixes readily with any type of paint or its thinner.

PRODUCE 170,438 LBS. HANSA YELLOW IN '36

Hansa Yellow continued to be one of the most important yellow organic pigments produced in 1936, according to statistics now available.

Production of Hansa Yellow during 1936 amounted to 170,438 pounds, the report discloses. During the same period sales of Hansa Yellow totalled 156,674 pounds. This represents an aggregate value of $211,941, based on a unit value of $1.35 per pound, the report continues.

The U. S. Industrial Chemical Co., Inc., has specialized in the manufacture of several important Hansa Yellow intermediates for a number of years. Among the products U.S.I. now offers are acetoacetanilid, acetoacet-o-chloranilid and acetoacet-o-toluidid.

U.S.I. ADVERTISING HEAD TO JUDGE POSTER ART

Outdoor Advertising, Inc., national sales representatives for the billboard media, have appointed Leslie S. Gillette, advertising manager of U.S.I. to serve on its Jury of Awards to judge outstanding merit in outdoor advertising design. The U. S. Industrial Alcohol Co. is the largest user of outdoor advertising in the anti-freeze field.

The competition, which is open only to Art Directors of recognized advertising agencies, closes Friday, October 1, 1937. This year $6,000 in prizes and 15 awards will be given for the best 24 sheet posters.

RUBBER-LIKE PAPER MADE WITH POLYMER

Stronger, Water-proof and Less Flammable—Manufacturer Reports

A process for coating paper with a thin film of polymerized vinyl halide—a rubber-like material already used for lining acid tanks and plating racks—has been developed, it was announced recently.

The coating material, known as Koroseal, is applied by means of a strong adhesive, according to the report. Forty pound Kraft paper is recommended.

Paper coated in this manner is said to be oil-, grease- and water-proof, as well as stable to light and air. Because of these properties, it is expected that packaging foodstuffs and medicines will be important applications.

Continuing his description, the manufacturer points out that the coating is less flammable than the paper to which it is attached. Greater tear resistance is another feature, he emphasized.

Standard specifications for Koroseal paper, as released by the manufacturer, are overall thickness, .006 to .0065 inch; weight, .308 pounds per lineal yard; size, rolls 200 yards long and 40 inches wide.

ROAD MARKINGS "GLOW" WITH NEW GLASS BEADS

Material for road-marking said to be 2,000 times as luminous at night, as any type of marking paint and more visible and lasting by day was demonstrated recently before state and municipal officials in several states. The material consists of a binder on which are spread, while wet, tiny glass spheres. It is reported that the line can be subjected to traffic twenty minutes after marking. (Ed. Note—Another article on this development will appear in the October issue of SOLVENT NEWS.

New C. D. Prices

Effective August 9, prices were announced for Completely Denatured Alcohol for the anti-freeze season of 1937-38, based on carload drums at 35c a gallon F.O.B. production points. Pacific Coast price schedules are 3c a gallon higher.

STRONG CAMPAIGN FOR SUPER PYRO NOW UNDER WAY

U.S.I. Expects 30% Increase In Sales, 6,000,000 Users, For Popular Anti-freeze

Six million Super Pyro users in 1937 is the goal at which the U. S. Industrial Alcohol Co. is aiming with release of its latest advertising and sales program for its premium quality, popular-priced anti-freeze.

This marks the fifth year for Super Pyro. When first introduced in 1933, Super Pyro was sold to 800,000 motorists. With increasing expenditures for advertising and promotion in succeeding years, this number jumped to 4,600,000 in 1936, making a total of 11,000,000 users in four years.

Raise Distributors' Commissions

Although prices of most dealer products have been raised, the price of Super Pyro to dealers and consumers remains the same as in preceding years. The commissions for distributors, however, has been raised 1%, making a total of 25% return for sales of 54- and 5-gal. drums and 24% on gallon and quart cans.

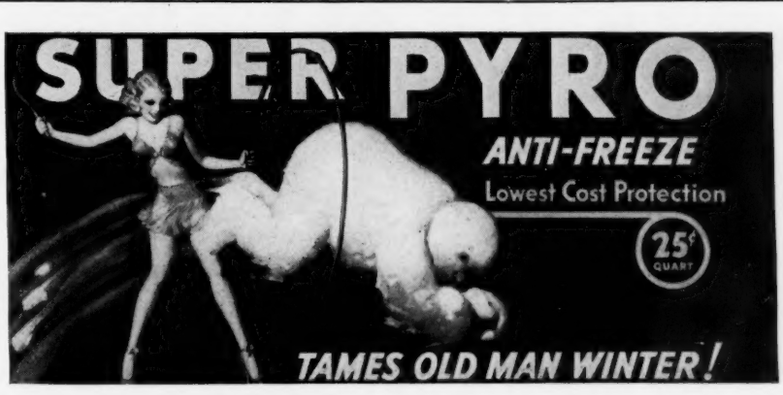
The current price schedule for dealers (east of Rocky Mountains) is 54¢ per gallon in 54 gal. drums; 60¢ in 5 gals. and 1 gal. round cans; and 65¢ in 1 qt. round cans. The consumer price is 25¢ per quart or $1.00 per gal.

Retain Special Features

There have been no changes in Super Pyro since it was introduced in 1933. It consists essentially of 200° proof denatured ethanol formulated with an exclusive, patented rust inhibitor which protects all six metals of the cooling system against rust, corrosion and electrolytic action. A special feature is a soluble oil which retards evaporation.

U.S.I.'s magazine campaign for 1937 includes schedules in the *Saturday Evening Post*, *Collier's*, *Life*, *Liberty*, *Country Gentleman* and *American Weekly*. Each magazine

(*Continued on next page*)



"OLD MAN WINTER," now identified in the minds of millions of motorists with Super Pyro anti-freeze, will again be featured on 24-sheet posters in U.S.I.'s 1937 campaign. The first of two designs to appear on approximately 10,000 billboards in the cold areas is reproduced above.

ADVERTISEMENT—*This entire page is a paid advertisement.*

SEPTEMBER ★ **SOLVENT NEWS** ★ 1937

MAKE GERMICIDE FROM AMYL ALCOHOL, CRESOL

A general antiseptic of which the chief components are amyl alcohol and cresol is nontoxic or injurious to humans in effective germicidal concentrations, it is claimed in a recent patent.

It may be produced by condensing U.S.P. cresol with amyl alcohol in the presence of zinc chloride, according to the patentee:

While other alcohols are also mentioned, the patent specifically refers to amyl alcohol as the one which produces the most general antiseptic. Normal, secondary, iso-amyl and tertiary amyl alcohols are all asserted to be satisfactory.

The germicidal strength of the fraction is said to vary inversely to the strength of the alkali solution which will separate it from the remainder of the condensation product.

STRONG SUPER PYRO CAMPAIGN UNDER WAY

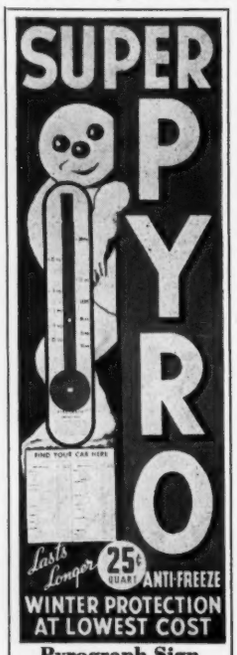
(*Continued from previous page*)

on the list will carry a minimum of three insertions, making a total of 70,000,000 advertisements reaching 16,000,000 readers.

This year U.S.I. continues to maintain its position as the pioneer and largest user of billboards in the anti-freeze field. An expanded campaign which comprises 10,000 boards in 200 cities and towns is being used.

Dealer material as in previous Super Pyro campaigns features a deluxe kit for dealers taking initial delivery of 80 gallons. A novel feature of this kit is the giant Pyrograph (right)—a special display sign which automatically computes the amount of Super Pyro needed for any car. Other materials in the deluxe dealer kit include a 3x5 feet weatherproof banner, pennants, leaflets, streamers and charts.

The dealer selling program is already well under way and current orders, ahead of last year's, point to U.S.I.'s exceeding its increased quota.



Pyrograph Sign

Water-Soluble Cellulose Salts For Backing Films

The metallic salts of dicarboxylic acid esters of cellulose form a valuable antihalation backing for photographic film, a recent patent discloses. They may be dyed to form a colored layer which is removed in the water in developing the film.

A typical salt is cellulose acetate sodium phthalate. Other uses suggested for these salts are in sizing or adhesive compositions or as a vehicle for carrying dyes or pigments.

ESTIMATE CAMPHOR BY NEW COLOR REACTION

Alcoholic solutions of camphor with furfural in the presence of sulphuric acid exhibit a bluish-violet color which varies in intensity according to the camphor content, it was announced recently.

This new color reaction, according to the report, may be used for colorimetric analysis by the following procedure. To 1 c.c. of the solution under examination is added 3 c.c. of 95% alcohol and 2 drops of 1% alcoholic solution of furfural. This mixture is stirred with the addition of 2 c.c. of strong sulphuric acid and boiled 5 minutes over a water bath. When the solution has cooled, 5 c.c. of alcohol is added.

The liquid obtained is compared against camphor solutions of known strength, using an absorption colorimeter, the report concludes.

A folder describing a method for determining the viscosities of 10% ½ second R. S. nitrocellulose solutions made with various solvents together with tables of viscosities of alcohol-water mixtures and sucrose solutions may be obtained by writing to U.S.I.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Three new grades of aluminum stearate are said to have the stearic acid content so regulated that the jelling effect produced may be regulated over a wide range by simple blending. They range from a mono-acid stearate, which is the most basic of the series, to a tri-acid stearate, the most acid. **(No. 1)**

U S I

The moisture content of wood, in the range 7 to 24 per cent, is easy to determine with a new portable electrical instrument, according to the manufacturer's description. The instrument is calibrated so that direct percentage readings at any one of 10 stages may be made. **(No. 2)**

U S I

Hammered metal finishes can be produced by adding a new paint vehicle to metallic powders, a vehicle manufacturer reports. When aluminum powder is used, for example, two coats of the mixture are sprayed on followed by a finishing coat of dull or clear varnish depending on the surface effect desired. **(No. 3)**

U S I

An excellent adhesive for water-proofed as well as porous material is said to result from the addition of a new solution to ordinary flour paste. According to the manufacturers of the solution, it penetrates the pyroxylin coating to form a strong bond. **(No. 4)**

U S I

A water-white unsaturated fatty acid said to be especially suited for preparing the white alkyd resins is now available commercially. The manufacturer claims superior drying qualities for the new product when incorporated in resins because it contains less than two per cent of saturated acids. **(No. 5)**

U S I

A pocket-size microscope capable of 40 magnifications for surface inspections in the plant or laboratory, was announced recently. Quality of a painted surface, pigment distribution and surface defects such as cracks, blow holes and wear can be seen clearly, it is reported. **(No. 6)**

U S I

A size for stamping and tooling on water-proofed materials is now on the market. The manufacturer claims that the size penetrates the waterproof coating and, when heat is applied, bonds the metallic foil to the fabric. **(No. 7)**

U S I

A new sanding emulsion is said to combine the ease of abrasive cutting of oil and naphtha with the detergent and cooling action of water for sanding, polishing and rubbing finished surfaces. The maker reports that the emulsion has been successfully used with standard rubbing and polishing compounds and is harmless to all finishes. **(No. 8)**

U S I

For conditioning fancy rayon and acetate yarns, a product now on the market is said to emulsify instantly in cool or warm water. Other characteristics reported are high stability, reduction of static electricity and resistance to oxidation and rancidity. **(No. 9)**

U.S.I. INDUSTRIAL ALCOHOL CO.
INDUSTRIAL CHEMICAL CO., INC.

WORLD'S LARGEST PRODUCERS OF ALCOHOL DERIVED SOLVENTS

Executive Offices: 60 East 42nd Street, New York, N. Y. Branches in all Principal Cities

AMYL ALCOHOLS
Refined Amyl Alcohol
Refined Fusel Oil
Secondary Amyl Alcohol

ETHYL ALCOHOLS
Specially Denatured
Completely Denatured
Anhydrous Denatured
Absolute—Pure
C.P. 96%—Pure and Denatured
Pure (190 Proof)—Taxpaid, Tax Free

*SOLOX—The General Solvent
*SUPER PYRO—The premium Quality Anti-freeze

BUTYL ALCOHOLS
Normal and Secondary

ISOPROPYL ALCOHOL

METHYL ALCOHOLS
95%, 97% and Pure

METHYL ACETONE

ETHYL ETHER
U.S.P. and Absolute (A.C.S.)

COLLODIONS
U.S.P., U.S.P. Flexible and Photo

NITROCELLULOSE SOLUTIONS

DIAMYL PHTHALATE
DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE

ACETIC ETHER

AMYL ACETATES
High Test — Commercial
Technical — Secondary

BUTYL ACETATES
Normal and Secondary

***DIATOL**

DIETHYL CARBONATE

ETHYL ACETATES
85-88%, 95-98%, 99% and U.S.P

ETHYL LACTATE
ISOPROPYL ACETATE
AMYL PROPIONATE
BUTYL PROPIONATE

ANSOLS
Ansol M Ansol PR

ACETOACETANILID
ACETOACET-O-CHLORANILID
ACETOACET-O-TOLUIDID
ETHYL ACETOACETATE
SODIUM ETHYL OXALACETATE
PARACHLOR-O-NITRANILINE

ACETONE
DIBUTYL OXALATE
DIETHYL OXALATE
ETHYL CHLORCARBONATE
ETHYLENE
URETHANE

***CURBAY**
POTASH BY-PRODUCTS

*Trade-mark registered

P. & G. Celebrates 100 Years of Service

Plans Huge Foreign Expansion—Specialty Associations Announce Meetings—British Symposium on Lubricants—Glidden Files With S. E. C.—

Procter & Gamble has completed the hundredth year of its existence, having been founded in 1837 by William Procter, who made candles, and James Gamble, who made soap.

As the fiscal year 1937-38 gets underway Procter and Gamble, Inc., is planning an elaborate program of plant expansion, modernization and improvement.

In the U. S. largest single project is a $1,000,000 addition to the company's new factory at Long Beach, Calif. This plant supplying a full line of P. & G. soaps and edible fats to the West Coast was completed only a short time ago at an estimated cost of more than $3,500,000. Present proposed addition will almost double plant capacity in certain of the most popular lines and will enable P. & G. to supply the demand west of the Rockies without importing goods from plants in other sections.

P. & G. is looking to foreign markets for future expansion. Present plants located at Newcastle and Manchester will be augmented by a new factory outside London. Negotiations for a factory site on the Thames River near the British capitol were recently completed and while final preparations for building have not been terminated it is understood that Thomas Headly, Ltd., the English subsidiary, will start erecting a plant on this site in the near future to manufacture all of their own line, as well as such well known American items as Oxydol, Ivory Flakes, etc.

In addition to the proposed English plant, P. & G. has elaborate plans aimed at improving the various facilities in the company's branch located in Hamilton, Ontario.

In the Cincinnati area plans are underway to construct a research and testing laboratory at Ivorydale at a cost estimated to be $750,000. This new building will greatly increase P. & G.'s laboratory facilities and will serve to consolidate existing services.

NADC to Gather at Chicago

Provided Lake Michigan does not duplicate the feat of the Ohio River in disrupting last year the annual meeting of the National Cleaners and Dyers, a very promising meeting awaits the members. Place is Chicago and at the Stevens on Jan. 17-20th. J. M. Matson, managing executive of the NADC, is preparing data relative to exhibit booths which will be leased shortly.

Disinfectant Makers in N. Y.

The National Association of Insecticide & Disinfectant Manufacturers will hold its mid-winter meeting at the Biltmore in N. Y. City on Dec. 6-7th. John Powell is chairman of the arrangements committee. The entertainment committee promises several new and special features and the program committee is busy arranging papers and speakers. Meeting this year follows closely on the heels of the Chemical Exposition, providing an extra attraction to out-of-town members.

The exterminators and fumigators are working on final plans for their 5th annual convention, which is scheduled to be held in Memphis, Oct. 25-27th. A number of companies have taken booths, including American Cyanamid & Chemical, du Pont, John Powell & Co., Rohm & Haas, Sonneborn Co., and several others.

Symposium on Lubricants

The British Council of the Institution of Mechanical Engineers, with the cooperation of other societies and institutions, will hold a general discussion on "Lubrication and Lubricants," Oct. 13-15th, when a series of some 140 papers from leading authorities throughout the world will be presented. An endeavor will be made to establish a correlation between theory and practice and show how bearing design can be applied, to correlate academic research with trade practice, to obtain current views upon bearing metals, and to review the significance of laboratory tests, including wear and friction tests.

An exhibition will be held at the Science Museum, South Kensington, to illustrate the subjects under discussion, and will be devoted to lubricants, bearings and bearing materials, as well as to testing and other apparatus. Support for the discussion has been given by 29 British societies and technical institutions and by 19 foreign societies and technical bodies. Additional information should be obtained from the secretary, Institution of Mechanical Engineers, Storey's Gate, St. James Park, London, S. W. 1, England.

Devoe Takes World Fair Space

Oldest manufacturing establishment in the U. S., the Devoe and Raynolds Co., which was founded in 1754, 183 years ago, has signed a contract for 10,000 sq. ft. of space in the N. Y. World's Fair of 1939 whereon to erect an exhibit building.

De Lancey Kountze, chairman of the board of the paint company who signed the contract in the Fair's offices in the Empire State Building, said the structure his company intends erecting at the Fair will be of ultra-modern design and will house a novel exhibit. A firm of distinguished architects has already been selected to prepare the plans.

Mr. Kountze sailed on Aug. 5th in the *Normandie* for France to visit the Paris Exposition. He stated he hoped thereby to gain additional ideas for guidance as to the company's Fair building and exhibits.

Study in Anti-Freeze

Popular automobile anti-freezes, for which the nation's motorists will pay $67,000,000 this year, are lost largely through leakage and spillage rather than through evaporation, according to Dr. H. C. Duus and his associates E. H. Keller and H. M. Cadot, chemists of the du Pont Co.'s "Zerone" Division, who reported the results of a 7-year investigation before a session of the A. C. S. convened at Rochester Sept. 7th for the 94th meeting.

According to widespread belief, explained Dr. Duus, shared alike by experts and the motoring public, all volatile anti-freezes are supposed to evaporate readily from the radiator, whereas non-volatile anti-freezes are supposed to remain undepleted. Tests, however, based on 300 carefully checked cars operating in Wilmington, Del., Boston, New York, Baltimore, Buffalo, Detroit, Chicago, Des Moines, Kansas City, Denver, and Salt Lake City show that in actual use, the losses of representative brands of both types of anti-freeze practically are the same.

Properties of Neoprene

Water resistance of neoprene was discussed by Howard W. Starkweather and Herbert W. Walker of the du Pont Jackson Laboratory, in a paper presented before the A. C. S., Division of Rubber Chemistry, Rochester, N. Y., Sept. 9th.

It was reported that the contraction in total volume during absorption of water by neoprene compounds containing magnesia is attributed to hydration of the magnesia. Neoprene compounds with a water resistance exceeding that of smoked sheet rubber compounds may be obtained by compounding with litharge and such additional activators as zinc sulfide and catechol. Rosin improves the water resistance of neoprene compounds at elevated temperatures. Sulfur decreases the water resistance of magnesia-zinc oxide and litharge neoprene compounds in proportion to the amount used. The influence of temperature on the water absorption of both magnesia-zinc oxide and litharge compounds also was determined.

In another paper presented by the same authors the influence of typical representatives of the common chemical classes of rubber softening agents on the properties of carbon black loaded neoprene was reported. The properties studied include plasticity, stability and retention of softness of uncured neoprene, and stress-strain properties, hardness and resistance toward solvents of cured neoprene. Certain softening agents have been found to be superior for special use.

New Products of the Month

A new series of synthetic detergents known under the trade name "Igepal" has been developed in Germany and introduced upon the market. These new products are reported to be based upon ethylene chloride. The "Igepal" group of synthetic detergents is marketed in two principal types known as "Igepal C" and "Igepal W." Two other products of the new series are designated "Igepal L" and "Igepal F."

Several new cements, which incorporate neoprene in their compositions, have been added to the line of cements sold by the B. B. Chemical Co. of Cambridge, Mass., (chemical division of United Shoe Machinery), under the name of Bostik. These new cements, in combinations with others made by the company in some cases, are adaptable to a variety of uses, including the adhesion of neoprene to rubber, neoprene to itself, neoprene to Thiokol, Thiokol to itself, crude rubber to Thiokol, neoprene or Thiokol to fabric.

One of the most recent scientific discoveries is the use of oat products, recently made available under the name of Avenex, for preserving the flavor and retarding oxidation, rancidity, and tallowiness in food products.

Oxidation is responsible not only for the loss of millions of dollars worth of food products annually, but is also the principal factor involved in the loss of fresh flavor of fatty foods in particular.

Manufacturers of ice cream, potato chips, nuts, candies and many other food products are using Avenex to help prevent oxidation and to delay the development of rancid and tallowy flavors. Avenex is employed also in the manufacture of parchment, glassine, and waxed paper, boxes and cartons where the treated packaging material serves the similar purpose of retarding rancidity development of such foods as lard, bacon, butter, coffee, whole wheat biscuits, etc.

Properties of Avenex were discovered and patented by the Musher Foundation and are being put to commercial use by The Quaker Oats Co.

Specialty Companies Expand

B. B. Chemical Co., Cambridge, Mass., has received bids for the contract to build 4 buildings on Memorial drive, Cambridge, from plans by Coolidge, Shepley, Bulfinch & Abbott, architects. Cost is estimated at $350,000.

Cole Chemical Corp. has acquired 30,000 sq. ft. of space and is now located at 37th ave., and 22nd st., Long Island City. At these quarters they will have their factory, warehouses and offices and will continue to manufacture a complete line of soaps, disinfectants, waxes, sprays, polishes, cleansers, insecticides, etc. In addition to this line they will also continue selling acids, ammonia, solvents and also all industrial, laboratory, and photographic chemicals. David D. Catts, treasurer, states that business has increased so tremendously that it was necessary to acquire this additional space.

Acquires Tide Water Plant

The Byerlyte Corp., 2300 W. 3d st., Cleveland, founded 24 years ago by the late F. X. Byerle, inventor of a process of making, from petroleum, asphalt for paving, roofing and waterproofing, has purchased from M. F. Bramley a deep water plant at Flushing, N. Y. Purchase was made so that the buyer would be guaranteed supplies of the base petroleum imported from Mexico and Venezuela.

Plant includes 340,000 sq. ft. of land with 60,000 sq. ft. of buildings and an $80,000 asphalt paving plant built by Bramley in 1920. On the extra land the Byerlyte Corp. will erect tankage capacity of 5,000,000 gals. Petroleum is to be pre-processed there and shipped to the Cleveland refinery in tank cars. Each boat load brought to the Flushing plant contains about 1,400,000 gals. of petroleum.

American Oil Takes Space

The Textile Mill End Division of American Oil & Supply, Newark, N. J., has increased its volume to such an extent that it has been found necessary to acquire additional space which has been taken under lease in the Tompkins Tidewater Terminal, Kearny, N. J.

Deaths of the Month

Michel Napoleon Cartier, 83, of Providence, R. I., founder and president of the M. N. Cartier & Sons Co., Inc., one of the largest manufacturers of roofing materials, paints and compounds in the country, died Aug. 21st as a result of an infection. He was a descendant of Jacques Cartier, discoverer of the St. Lawrence River.

Allen F. Carlson, 32, a member of the firm of John P. Carlson, Inc., manufacturers of printers' inks, Brooklyn, died on Aug. 22nd after a brief illness.

He was a graduate of the Marquand School in Brooklyn and, immediately after completing his course, entered the firm founded by his father 17 years ago in Brooklyn.

Mr. Carlson soon afterward was made a member of the firm and put in charge of the factory. In addition to supervising the operations of the plant he was in charge of distribution.

Phillip C. Meon, 51, vice-president-treasurer and a director of Borne-Scrymser, (lubricants and petroleum oils), N. Y. City, died July 31st, from an appendectomy at Bridgeport, Conn. A native of N. Y. City, Mr. Meon came to Borne-Scrymser Co. in 1906. He is survived by his wife and 3 daughters.

Haering Appointments

D. W. Haering & Co., scale and corrosion control chemical and proportioning manufacturers, Chicago, announce following increases in personnel and facilities: Complete laboratory and consulting facilities for the Southwest through Wichita Testing Laboratories, Wichita, Kan., under the direction of Charles E. Erb. Similar facilities for the West Coast through Best & Co., Alameda, Calif., under the direction of Dr. Otto Best.

Complete sales, service and warehousing facilities for the East with offices at 521 W. 5th st., N. Y. City, under the direction of Leon Garneau, famed corrosion expert. Also appointment of Joseph Mallock as district manager in charge of Michigan with headquarters in Detroit; appointment of B. S. Coop as district manager in charge of the south with headquarters in Atlanta; promotion of Guy Hamilton to the position of district manager in charge of Tennessee, with headquarters in Nashville; and the addition of Daniel F. Mortara, chemical engineer, and Donald C. Suhr, civil engineer, to the staff in Chicago.

Receiver Appointed

L. Shein, Providence, R. I., attorney, has been appointed by Judge Leonidas Pouliot of the Superior Court as temporary receiver of Reliance Chemical Products, Inc., of Pawtucket, on the petition of Simon Norman of Providence, vice president and owner of one-half of the capital stock of the corporation.

Petitioner seeks dissolution of the corporation and, pending the receivership proceedings, creditors are enjoined from bringing suit.

Fights Pyroxylin Storage

Management of the Hygrolite Co., Arlington, N. J., manufacturers of a solution used to treat textiles, has requested the Kearny Council to refuse to grant the Emeloid Co. permission to store "high-powered pyroxylin" in the plant at Schuyler and Laurel avenues.

A spectacular pyroxylin fire preceded by an explosion razed two out-buildings of the Emeloid Co. last month, causing $5,000 damages. Fire spread to the Hygrolite plant, burning the roof, releasing the sprinkler system and causing water damage.

Glidden Files With S. E. C.

Glidden has filed a registration statement with the SEC under the Securities Act covering 78,400 12-25 shares of no par common and subscription warrants calling for that amount. Stock will be offered to holders of the company's outstanding common stock in the ratio of one new share for each 12½ shares held.

Just off the press

YOU may be a manufacturer of corrugated or solid fibre boxes; of soap, textiles or refractory cements...

Or, again, you may be interested in metal cleaning, or you may want a better laundry detergent... in any event there is a STANDARD SILICATE ALKALI that best serves the purpose, no matter how widely varied the requirements of industry may be!

This new 16-page booklet, just off the press, gives you the facts about each of Standard's brands and grades, specifications, major uses and general information. Every industrial operating executive should have a copy. Write!

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- CONCRETE SILICATE
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KOPPERS BUILDING • PITTSBURGH, PA.
Plants at CINCINNATI · JERSEY CITY · LOCKPORT, N. Y. · MARSEILLES, ILL.

New Trade Marks of the Month

378,490. Clair F. Limbeck (Alfagold Co.), Dubuque, Iowa; May 15, '36; insecticides, germicides, disinfectants, weed killer; use since Mar. 1, '32.

378,562. Graeme Harrison Products, Inc., New York City, assignor to Van Cleef Bros., Chicago, Ill.; May 18, '36; rubber, cements and adhesive tapes; use since Mar. 24, '36.

380,866. Gendron Chemical Co., Inc., New York City; July 10, '36; fire scale and soot eradicator; use since Jan. 15, '34.

380,909. Ford Hopkins Co., Chicago, Ill.; July 11, '36; insecticides; use since Jan. 1, '34.

382,186. Ultra Chemical Works, Inc., Paterson, N. J.; Aug. 11, '36; finishing oil for animal skins; use since June, '35.

384,191. Boll-We-Ex, Inc., Memphis, Tenn.; Oct. 10, '36; insecticides; use since Apr. 19, '24.

384,429. New Orleans Alcohol & Distilling Corp., New Orleans, La.; Oct. 16, '36; denatured alcohol for industrial solvent; use since Sept. 5, '36.

384,690. Roosevelt & Sustrin, New York City; Oct. 22, '36; washing and soaking compounds having incidental properties for increasing wearing qualities of fabrics; use since Apr., '35.

384,849. Benj. Gittleman (Lincoln Lace & Braid Co.), Cranston, R. I.; Oct. 27, '36; shoe polish; use since Oct. 22, '36.

385,024. Addressograph-Multigraph Corp., Cleveland and Euclid Village, O.; Nov. 2, '36; inks and inked ribbons; use since July, '34.

385,054. Patti R. MacNair (Kala-Klean Chemical Co.), Kalamazoo, Mich.; Nov. 2, '36; cleaner for woodwork and varnished, lacquered, painted, and enameled surfaces; use since Oct. 1, '36.

385,505. Central Scientific Co., Chicago, Ill.; Nov. 14, '36; lubricating and sealing oils for high vacuum pumps; use since Oct. 10, '36.

385,745. Parker Rust Proof Co., Detroit, Mich.; Nov. 19, '36; rustproofing compounds; use since Sept. 16, '36.

386,390. Ironhard Paint & Color Works, Ltd., Los Angeles, Calif.; Dec. 5, '36; paste, paints, varnishes, and enamels; use since Jan. 1, '35.

386,940. Galree Products Co., Inc., New York City; Dec. 19, '36; compound for prevention silver tarnishing; use since July 15, '36.

387,202. National Lead Co., New York City; Dec. 28, '36; lead, paints, and related products; use since 1907.

388,053. Durenamel Paint Co., Inc., St. Louis, Mo.; Jan. 22, '37; ready mixed paints, varnishes, etc., use since Oct. 15, '36.

387,712. Semet-Solvay Co., New York City; Jan. 12, '37; plastic bituminous compositions; use since '25.

389,522. Morvasheen Corp., Los Angeles, Calif.; Mar. 1, '37; protective waterproof coating paint materials; use since Sept. 15, '35.

388,417. Sears, Roebuck & Co., Chicago, Ill.; Feb. 1, '37; anti-freeze solution; use since Oct. 24, '35.

388,776. Frank C. Scott & Co. (Indianapolis Mfg. & Sales Co.), Indianapolis, Ind.; Feb. 11, '37; boiler compound; use since Aug. 13, '34.

388,860. U. S. Drug & Chemical Corp., Malden, Mass.; Feb. 12, '37; antiseptic, germicide, and disinfectant; use since Jan. 1, '35.

389,218. Freedom Oil Works Co., Freedom, Pa.; Feb. 20, '37; illuminating oils; use since Oct. 1886.

387,203. National Lead Co., New York City; Dec. 28, '36; white lead, paints, red lead, pigments, etc.; use since 1919.

388,305. Howard E. Cann (H. E. Cann Co.), Balto., Md.; Jan. 29, '37; for waterproofing building materials; use since June, '29.

389,858. National Oil Treat Co., Tyler, Tex.; Mar. 5, '37; chemical for dissolving paraffin in crude oil; use since Sept., '36.

390,110. Willie Gurr (C. & G. Labs.), Albany, Ga.; Mar. 15, '37; insecticides; use since Jan. 1, '36.

390,416. E. I. du Pont de Nemours & Co., Wilmington, Del.; Mar. 23, '37; textile fungicides; use since Mar. 25, '35.

390,457. Air-Seal, Ltd., Los Angeles, Calif.; Mar. 24, '37; puncture proofing compound; use since Sept. 1, '35.

389,252. Harry G. Hutson, Atlanta, Ga.; Feb. 23, '37; insecticide; use since Jan. 11, '37.

389,843. Metropolitan Roofing Supplies Co., Inc., New York City; Mar. 9, '37; plastic fibrous cement; use since Apr. 3, '36.

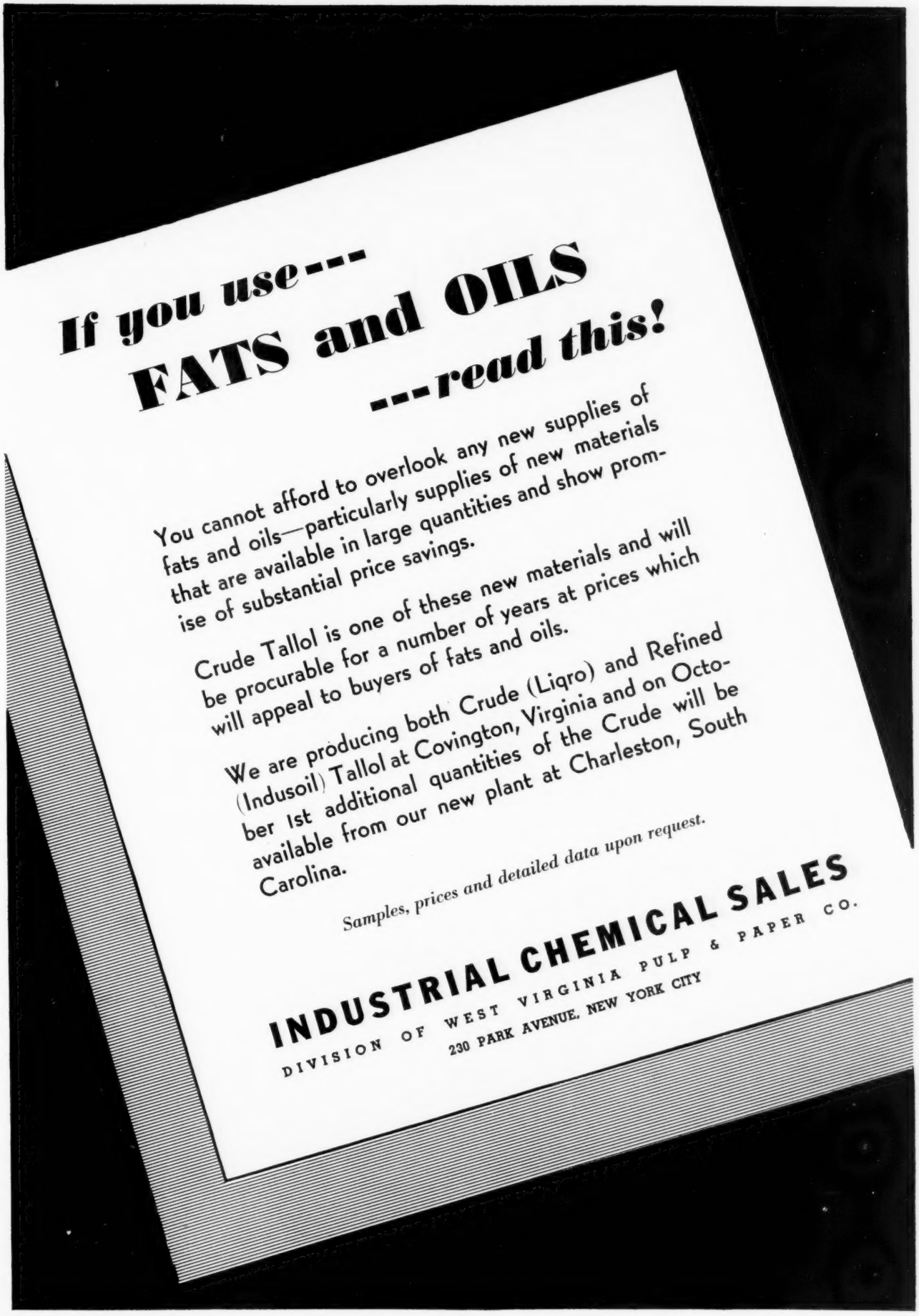
390,564. L. Sonneborn Sons, Inc., New York City; Mar. 26, '37; lubricating oils; use since Jan. 22, '37.

390,659. Frank G. McWilliams (Antzgo Products), Lakewood, O.; Mar. 29, '37; ant killer; use since Dec. 1, '36.

391,211. General Paint & Varnish Co., Chicago, Ill., Apr. 12, '37; paints, enamels, stains, and varnishes; use since Jan. 1, 1922.

391,600. Universal Motor Oils Co., Wichita, Kans.; Apr. 20, '37; lubricating oils and greases; use since Sept. '36.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, July 13 to middle week August 10.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FATS and OILS
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Crude Tallol is one of these new materials and will be procurable for a number of years at prices which will appeal to buyers of fats and oils.
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DIVISION OF WEST VIRGINIA PULP & PAPER CO.
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SPRAY CATALIZER
391,657

392,548

PROPERT'S
392,655

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TOUR-PACK
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Resinalt
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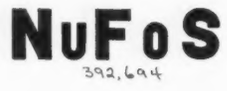

392,694

ROYAL
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CREVISEAL
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MEDIALAN
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WARCOZYME
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Formolite
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BARTEX
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BLOOM RIOT
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SO-CRE-SIL
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STEVENIZE
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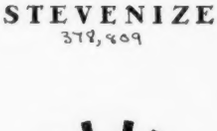

392,818

SYLPHLOC
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KEL-CRETE
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KEL-LITE
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KELMIX
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393,186

392,750

PAN-SAYF
392,861

SPEEDEE
392,872

VANI-SOL
392,900

Tilette
392,942

PLASTONE
393,034

SPRALASTIC
393,048

393,069

391,657. B. G. Pratt Co., New York City; Apr. 21, '37; sulfur ingredient for plant sprays; use since Feb. 10, '37.

391,731. An-Our Co., Cincinnati, O., Apr. 23, '37; cleansing preparation having ineidental properties as disinfectant; use since July 1, '34.

391,745. Columbia Refining Co., Long Island City, N. Y.; Apr. 23, '37; motor lubricating oils and greases; use since Jan. 15, '37.

391,756. Lloyd A. Fry Roofing Co., Chicago, Ill.; Apr. 23, '37; composition and asphalt coated roofing and shingles; use since Feb. 22, '32.

391,937. Kutol Products Co. (Royal Chemical Co.), Cincinnati, O.; Apr. 26, '37; waterless industrial soap compound; use since Mar. 1, 1930.

391,973. Red Seal Chemical Co., Los Angeles Calif.; Apr. 28, '37; compounds for conditioning rotary drilling mud; use since Jan. 15, '37.

392,490. General Dyestuff Corp., New York City; May 8, '37; non-soapy washing and scouring preparations; use since Nov. 18, '36.

392,548. Stephen A. Nagy (Wolverine White Metal Co.), Detroit, Mich.; May 10, '37; solder; use since May 1, '36.

392,655. Salomon & Phillips, New York City; May 12, '37; leather and saddle soap, shoe and leather polishes, dressings, cleaning compounds, and cloth cleaning fluids and compounds; use since October, 1887.

392,681. Diversey Corp., Chicago, Ill.; May 13, '37; washing compound in powdered form; use since Oct. 15, '36.

392,694. Mathieson Alkali Works, Inc., New York City; May 13, '37; alkali cleanser in briquet form; use since Mar. 25, '37.

392,698. National Lead Co., New York City; May 13, '37; varnishes, paints, enamels, marine paints, preservative coatings; use since Sept. '31.

392,699. New Products Corp., Indianapolis, Ind.; May 13, '37; ammonia, bleach, drain cleaner; use since Feb. 23, '37.

392,700. New Products Corp., Indianapolis, Ind.; May 13, '37; lye, drain cleaner, bleach, and ammonia; use since Feb. 17, '37.

392,705. Phila. Quartz Co., Phila., Pa.; May 13, '37; silicate of soda; use since Apr. 11, '35.

392,707. Phila. Quartz Co., Phila., Pa.; May 13, '37; silicate of soda; use since Apr. 20, '37.

392,708. Phila. Quartz Co., Phila., Pa.; May 13, '37; silicate of soda; use since Apr. 20, '37.

392,724. Warwick Chemical Co., West Warwick, R. I.; May 13, '37; enzymatic desizing chemical for use in textiles, paper, etc., industries; use since Aug. 7, '36.

392,769. Pulp Products Co., Inc., New York City; May 14, '37; chemically treated fibrous wood pulp; use since May 8, '37.

392,774. Chas. F. Schoening, Phila., Pa.; May 14, '37; adhesives used as fabric cement; use since April, 1935.

393,065. Nathaniel Francis Cheairs (N. F. Cheairs & Co.), Winchester, Ky.; use since May 21, '37; fertilizers; use since May 10, '37.

392,775. Scott Chemical Co., Lynn, Mass.; May 14, '37; cleansing and detergent preparation for removing grease and oil from automotive or industrial machines; use since May 12, '37.

392,777. Socony-Vacuum Oil Co., Inc., New York City; May 14, '37; disinfectant and antiseptic; use since Aug. 2, '35.

378,809. Stevens Polishing Co., Coraopolis and Imperial, Pa.; May 23, '36; metal polish, used also for automobiles; use since Mar. 2, '36.

392,818. Sunset Oil Co., Los Angeles, Calif.; May 15, '37; motor lubricating oils; use since Jan. 1, '27.

392,819. Sylvania Industrial Corp., Fredericksburg, Va.; May 15, '37; non-fibrous cellulosic products; use since May 13 ,'37.

392,825. M. W. Kellogg Co., Jersey City, N. J., and New York City; May 15, '37; refractory insulating brick; use since Mar. 31, '37.

392,826. M. W. Kellogg Co., Jersey City, N. J., and New York City; May 15, '37; refractory insulating brick; use since Apr. 19, '37.

392,827. M. W. Kellogg Co., Jersey City, N. J.; and New York City; May 15, '37, refractory surfacing material, use since Mar. 31, '37.

392,860. Griffith Labs., Inc., Chicago, Ill.; May 17, '37; germicidal cleanser, antiseptic, and deodorant for meat, bakery and like establishments; use since Sept., '32.

393,186. John Pritzlaff Hardware Co., Milwaukee, Wis.; May 24, '37; lubricating oils and greases; use since Nov. 20, '33.

392,750. J. S. Fickel, Denver, Colo.; May 14, '37; household cleansers for tile, bath tubs, etc.; use since Apr. 1, '37.

392,861. Griffith Labs., Inc., Chicago, Ill.; May 17, '37; alkaline non-corrosive detergent for cleaning kitchen utensils and metal food containers; use since Feb., '35.

392,872. Wm. L. Latshaw (X-Termo Products), Chicago, Ill.; May 17, '37; insecticides; use since May 1, 1932.

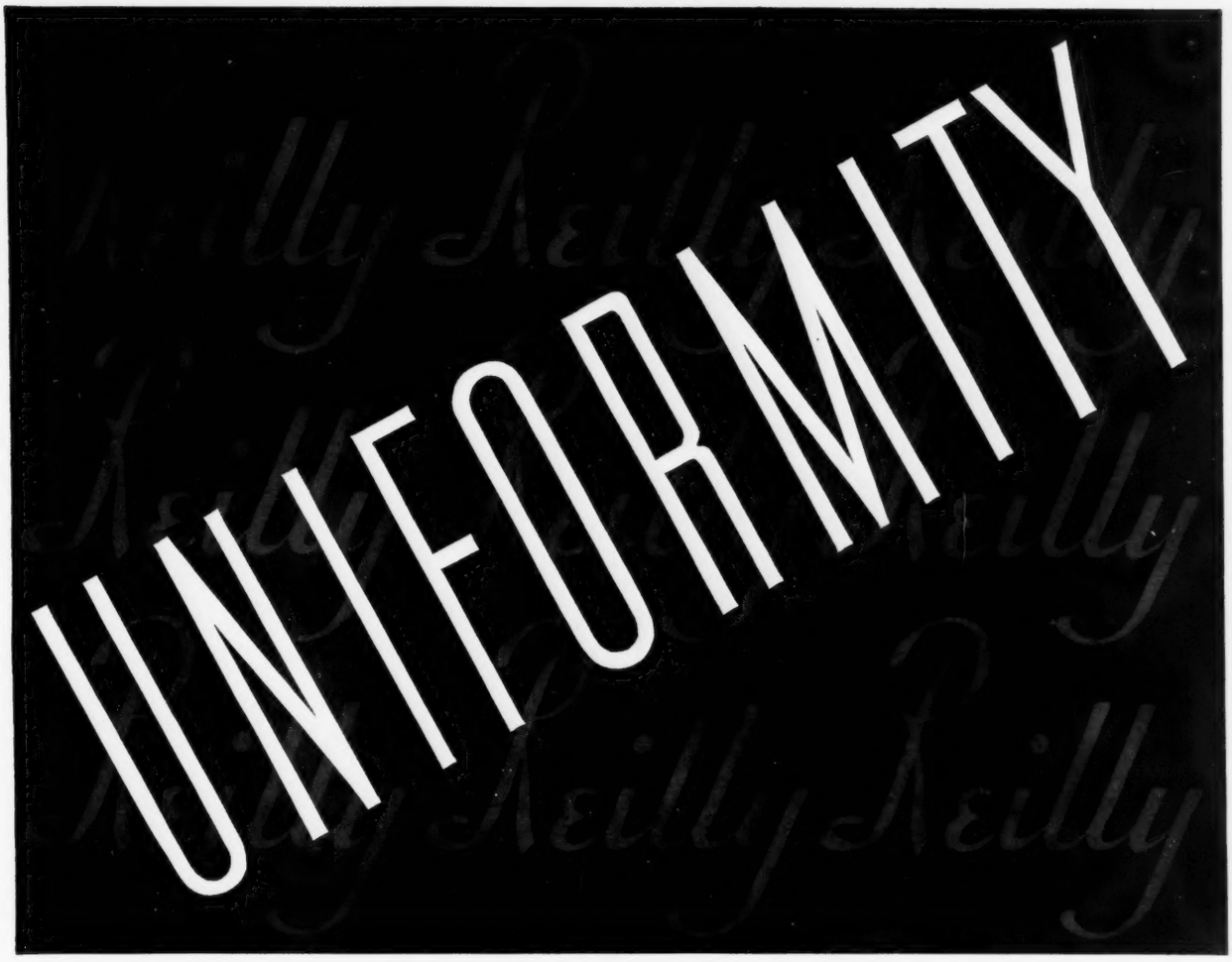
392,900. Lisle C. Van Nest (National Labs.), Toledo, O.; May 17, '37; toilet bowl cleaner; use since May 11, '37.

392,942. Tilette Cement Co., Inc., New York City; May 18, '37; plastic cement, use since July, 1925; spud cement, since July, 1929; iron cement, since May, 1930; waterproof mender, since May, 1933; and water mix spud cement, since July, 1935.

393,034. Curtis J. Harwick (Standard Chemical Co.), Akron, O.; May 20, '37; adhesion-preventing material for rubber vulcanizing molds; use since Apr. 23, '37.

393,048. Sherwin-Williams Co., Cleveland, O.; May 20, '37; insecticides, fungicides, and flocculators; use since Mar. 31, '37.

393,069. Dye-Col Products, Inc., New York City; May 21, '37; fungicide; use since May 20, '37.



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Reilly production methods . . . rigid laboratory control . . . the elimination of variables in raw materials, all combine to assure users of Reilly Coal Tar Products constant uniformity of quality in all materials supplied. Four decades of progress in the Coal Tar Industry and fifteen strategically located plants to serve you, warrant complete reliance on Reilly as your source of supply.

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SPECIAL PRODUCTS: CARBON COKE - COAL TAR PAINTS - COAL TAR PITCH - BITUVIA ROAD TAR - FLOTATION OILS - PIPE COATING - TRANSOTE - ROOFING FELT, PITCH AND TAR

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PARASAT–PARASAN
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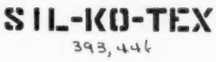

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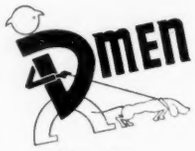

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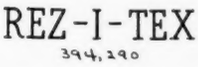


394,290

393,071. Dye-Col Products, Inc., New York City; May 21, '37; insecticides; use since May 11, '37.

393,081. I. F. Laucks, Inc.; Seattle, Wash.; May 21, '37; glues and adhesives; use since May 5, '37.

393,124. Fink-Roselieve Co., Inc., New York City; May 22, '37; photographic preparations and chemicals; use since May 20, '37.

393,149. Stauffer Chemical Co. of Texas, Freeport, Tex., and New York City; May 22, '37; insecticides; use since Feb. 3, '32.

393,168. Givaudan-Delawanna, Inc., New York City; May 24, '37; printing inks; use since Feb. 1, '37.

393,213. Eled Enterprises, Inc., New York City; May 25, '37; stone cleaning and rejuvenating compound; use since Nov., '36.

393,235. Special Chemicals Corp., New York City; May 25, '37; metal plating preparations; use since Aug., 1934.

393,282. Intava, Ltd., London, England; May 26, '37; lubricating oils; use since May 13, '37.

393,354. Andrew F. Wineburgh (Soapless Products Co.), New York City; May 21, '37; soapless detergent; use since Mar. 20, '37.

393,295. Edw. Steinholtz (Atlas Protexit Co.), New York City; May 26, '37; prepared waterproof plastic compound for building purposes; use since Aug., 1934.

393,325. Fink-Roselieve Co., Inc., New York City; May 27, '37; photographic preparations and chemicals; use since Dec. '36.

386,014. Dewey Portland Cement Co., Kansas City, Mo.; Nov. 27, '36; Portland cement; use since Oct. 22, '36.

392,917. Davison Chemical Corp., Balto., Md.; May 18, '37; fertilizers; use since Mar. 4, '35.

392,916. Davison Chemical Corp., Balto., Md.; May 18, '37; fertilizers; use since Mar. 29, '37.

393,362. B. T. Babbitt, Inc., New York City; May 28, '37; cleaner for enamel, porcelain, pots, etc.; use since 1926.

393,375. W. T. Grant Co., New York City; May 28, '37; shoe polish; use since June 17, '33.

393,393. Seboreen Labs., Inc., of Chicago, Chicago, Ill.; May 28, '37; deodorant; use since Apr. 28, '37.

393,411. California Stucco Co., Ltd., Los Angeles, Calif.; May 29, '37; soap base stucco and wall cleaning compound; use since Apr. 3, '37.

393,446. Quaker Chemical Products Corp., Conshohocken, Pa.; May 29, '37; oleaginous preparation for use as soaking medium in softening, scouring, and lubricating textile fibers; use since May 3, '37.

393,485. Haas-Miller Corp., Phila., Pa.; June 1, '37; textile oils and chemicals; use since Feb. 20, '36.

393,313. H. Behlen & Bro., New York City; May 27, '37; varnishes, paints, enamels, glues, etc.; use since May, '36.

393,486. Haas-Miller Corp., Phila., Pa.; June 1, '37; hygroscopic agent for textile printing mixtures; use since Feb. 20, '36.

393,487. Haas-Miller Corp., Phila., Pa., June 1, '37; textile oil or size for binding twist in rayon filling stock or wefts; use since Feb. 17, '37.

393,522. Ball Chemical Co., Pittsburgh, Pa.; June 2, '37; aluminum paint; use since May 3, '37.

393,544. National Lead Co., New York City; June 2, '37; dry white lead; use since Dec., '30.

393,556. Socony-Vacuum Oil Co., Inc., New York City; June 2, '37; turpentine; use since 1875.

393,673. Thompson, Weinman & Co., Inc., Cartersville, Ga.; June 4, '37; clay filling material for use in rubber products; use since Jan., '37.

393,843. Diversey Corp., Chicago, Ill.; June 9, '37, disinfectants, germicides, sterilizers, sodium meta silicate; use since Jan. 15, '37.

391,361. Louis C. Van Patten, Cheney, Wash.; Apr. 14, '37; waterproofing preparation for leather, etc.; use since July 31, '36.

393,846. Floridin Co., Warren, Pa.; June 9, '37; oil decolorizing adsorption agent prepared from natural earth; use since April 10, '37.

393,872. Penola, Inc., Pittsburgh, Pa.; June 9, '37; dry, paste, ready mixed and metallic paints and paint oils; use since May 15, '37.

393,906. General Printing Ink Corp.; New York City; June 10, '37; printing ink, use since Apr. 3, '37.

393,968. American Aniline Products, Inc., New York City; June 12, '37; waterproofing and water repelling agents for textiles; use since June 4, '37.

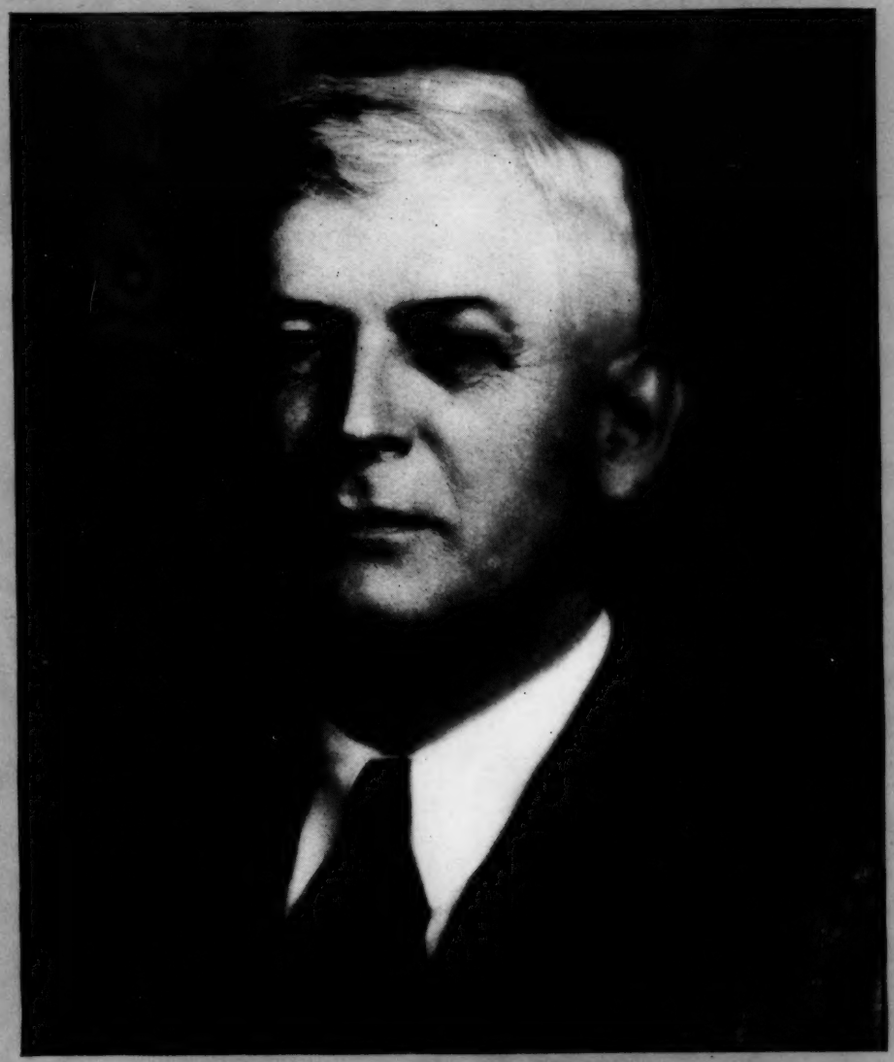
394,140. Black & Decker Mfg. Co., Towson, Md.; June 16, '37; automobile polish; use since Aug. 20, '36.

394,178. Karsmetik Co., Inc., New York City; June 17, '37; grease eradicators and cleaners and polishers for coated and metallic surfaces; use since Sept. 25, '33.

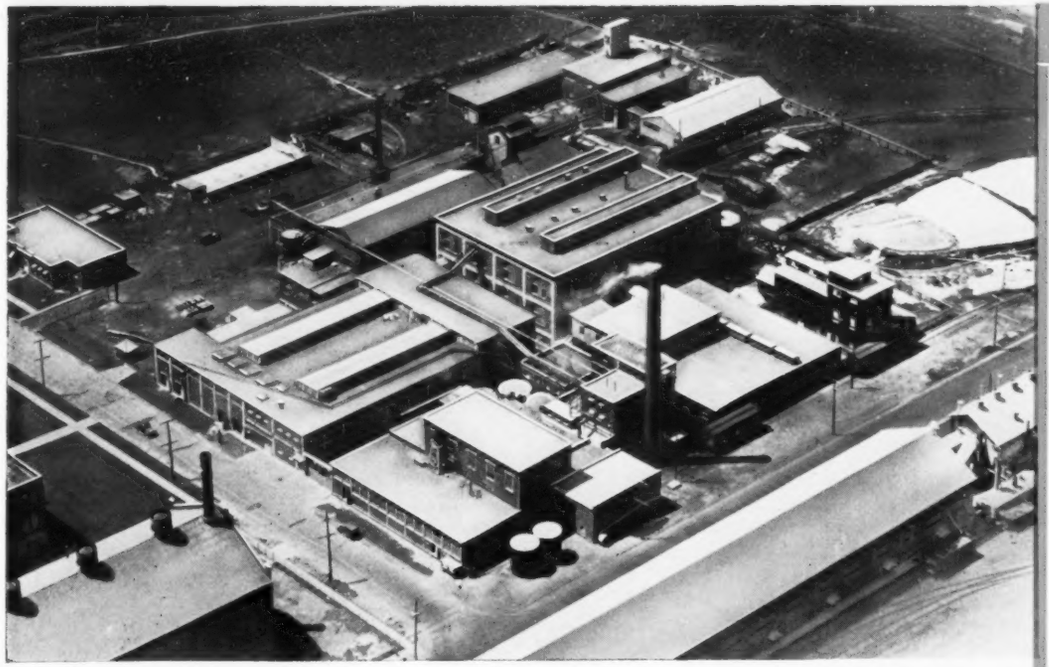
393,256. Glidden Co. (Adams & Elting Co.), Cleveland, O.; May 26, '37; paints and paint enamels; use since June 8, '36.

394,290. I. F. Laucks, Inc., Seattle, Wash. June 19, '37; paints, use since June 10, '37.

CHEMICAL NEWS & MARKETS



Monsanto's new vice-president, R. J. Hawn



Where RELIABLE INDUSTRIAL CHEMICALS are produced . . .

Here are the ISCO CHEMICAL DIVISION Plant and office as they look to the occupant of a plane circling above Niagara Falls ● In this plant is every facility for the production of those good industrial chemicals sold under the ISCO trade mark and backed by a reputation which goes back 131 years. Some of these good chemicals are listed at the left.

CAUSTIC POTASH
From all-American raw materials
All forms and packages—
FLAKE — SOLID — GRANULAR
WALNUT — BROKEN — LIQUID

CAUSTIC SODA
In this product we have achieved notable improvements over the standard grades.
PRIME SOLID—Fused 76%
FLAKES—76%
CRYSTALS—76%
LIQUID—Any strength solution.
Tank cars and drums

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35/37%—Free Flowing—High Test. Available also in our rubber bag containers, 10 lbs. each. Six to wooden case.

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The demand for ISCO Iron Chloride has kept us sold to capacity. Increased facilities make it now possible for us to meet increased calls.

CARBONATE OF POTASH—
From American raw materials
Hydrated 83/85%; Crystalline Form, Calcined 98/100%; Fine Granular Form, also Liquid 47%, water white; in tank cars and drums.

LARVACIDE (*Chlorpicrin*)
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SINO-JAP WAR CREATES SHORTAGES

Chinawood Prices Nominal—Competing Oils Advanced—Tungsten at $26 per Ton—Shipping Facilities To and From Orient at a Premium—

The Sino-Japanese crisis provided the most important news of the month in the chemical field and has driven home the pertinent fact that despite our enviable and almost impregnable position in raw materials we are still very much dependent upon outside sources for many commodities, some of which are in the indispensable classification. Fortunately in the event of a more serious turn of affairs most of our importations from the Far East are of such character that they can be replaced or substituted for. Yet some serious inconveniences are possibilities.

Foreign trade is usually a two-way proposition. Our chemical exports to China while not an impressive percentage of our total production or even of our total exports, amounted to approximately $5,000,000 in the past year, about 14% of the total imports of chemicals and related products going into China. Approximately $7,000,000 of exports to Japan will be in jeopardy if the neutral act is invoked by Washington.

First product to feel the effect of the Far East situation was Chinawood oil. Quotations have advanced sharply and, in trade vernacular, are strictly "nominal." Prices ranging between 16 and 20c are mentioned, but it is believed that very little business has actually been placed in the past two weeks.

Tung oil producers in the Yangtze River valley of China, anticipating current situation, made every effort during June and July to clear as much oil through the Port of Hankow as possible, and as a result clearances for the period were the highest in the history of the industry. A total of 14,614 short tons of tung oil were cleared through the port in June—14,042 tons going directly to the U. S.—and in July shipments reached 10,868 tons with 9,042 tons being destined for the American market. In the same months last year Hankow exported a total of 11,798 tons of oil, according to the *Tung Oil Monthly*, published by the Dept. of Commerce.

Competing Oils Higher

Competing oils are naturally higher. Oiticica from Brazil and Perilla from Manchuria have had several sympathetic increases. The trend in these and other oils supplied from the Far East depends upon the length and scope of war activities in that section.

More than two-thirds of the world's supply of tungsten ore comes from China. In '33 the quotation on wolfram stood at $2.50 per ton. In the past 10 days material was said to be unavailable at $26 per ton.

Egg albumen and egg yolk are still other commodities which have already been advanced sharply. Still others are Japanese menthol, Japan wax, anise oil, and anise seed. As the month closed no price rises had been announced for antimony, agar, Japanese camphor, and pyrethrum flowers, but consumers are anxiously awaiting developments.

Shipping facilities are badly disarranged on the Pacific. The port of Shanghai has been closed to American vessels under American Government orders. Japanese shipping tonnage is being withdrawn for transport purposes. What Japan's attitude will develop into on shipments going to and coming from China in foreign bottoms is still problematical. It is quite generally conceded that Japan did not expect as stiff resistance on the part of the Chinese as she is experiencing. This may force Japan into moves which she did not contemplate in the beginning. Further, additional complications have arisen and may even become definitely more serious because of the attack on the British Ambassador. At the moment the Far East is seething.

Solvay Officials Deny Coercion at Hopewell

Clark, Plant Manager, Files Answer With Labor Relations Board—American Potash & Chemical Ordered to Reinstate 19 Employees—

Labor difficulties in the chemical field appear to be disappearing rapidly and a different situation exists now in comparison to conditions 60 or 90 days ago. At no time has the labor problem in the chemical field assumed the prominence that it has in the automotive, steel and other industries, yet in the past few months company executives have been called upon to devote considerable time to management-labor relationships.

Officials of Solvay Process, at Hopewell, Va., denied emphatically last month that the company had taken any part in the organization of the Solvay Workers Council, which has been recognized as the bargaining agency of the plant's employees. Frank C. Clark, manager of the Hopewell plant, issued a statement denying such allegations.

Mr. Clark also denied in the statement that any labor controversy exists in the plant that in any way interferes with the company's operations.

Statement was issued by Mr. Clark in reply to a complaint filed with the National Labor Relations Board by an organization known as Federation of Architects, Engineers, Chemists and Technicians. Mr. Clark stated that while the company had filed its answer with the labor board he had not been notified of the setting of a date for any form of hearing.

Following is Mr. Clark's statement:

"We are filing an answer denying the allegations of a complaint under the National Labor Relations Act that the Solvay Process Co. during the month of May, 1937, and thereafter sponsored, dominated and interfered with the formation of a labor organization known as Solvay Workers Council and have contributed financial aid and other support to such organization.

"We have never heard of the Federation of Architects, Engineers, Chemists and Technicians and do not know any particulars of the charge against us. In fact we are given no more details or information than that stated.

"Complaint also charges that there is a labor dispute in the plant caused by the alleged interference by the company with the Solvay Workers Council and that this labor dispute obstructs inter-state commerce and interferes with the sales and shipment of the products of the plant.

"There is no foundation for these charges and we deny them in toto as in our answer filed with the board."

American Potash Loses Before Board

The National Labor Relations Board on Aug. 2nd issued an order against American Potash & Chemical, ordering the company to disband its plant union and to reinstate 19 employees who the board found had been discharged for union activity.

Order was based on complaints of the Borax and Potash Workers Union No. 20181, an affiliate of the A. F. of L. Examiners for the board held hearings in Randsburg and Los Angeles in the Spring and Fall of 1936, and their findings were the basis of the board's order.

Kellogg to Deal with C. I. O.

Employees of Spencer Kellogg, linseed oil plant in Edgewater, N. J., have returned to work under a contract naming a C. I. O. union as the sole bargaining agency and providing wage increases of from 4 to 8½c an hour.

Spencer Kellogg workers started a sit-down strike but evacuated the plant when the company promised to negotiate further.

According to news reports from Washington a new drive for the unionization

of chemical workers will be undertaken shortly by the United Mine Workers' Association, a C. I. O. group. John L. Lewis heads both organizations.

Industrial Sales Formed

African Metals Corp. announces the organization of Industrial Sales Corp. to take over its chemical, steel, and cement business. New corporation will have general offices in the Lincoln Bldg., 60 E. 42nd st., N. Y. City; phone—Murray Hill 2-0920.

African Metals Corp. states that no change has taken place in its financial control and management and that the new corporation will operate under the same auspices.

Industrial Sales Corp. has taken over all contractual obligations of the chemical, steel and cement divisions of African Metals, as well as the representations of Union Chimique Belge, S. A. John Cockerill, and Societe Commerciale d'Ougree, all of Belgium.

Victor Mikolajczak, a director of African Metals, has been elected chairman of the board of directors of Industrial Sales, and M. L. Blanc, former treasurer of African Metals is president and treasurer of the new company. Charles Glass is vice-president in charge of chemical sales and Joseph L. Wilmotte in charge of steel sales.

Directors include Dr. Camille Gutt, a director of African Metals, Henry Blaise, Alfred H. Phillips, besides Mr. Mikolajczak and Mr. Blanc. A. M. Finnie will succeed Mr. Blanc as treasurer of African Metals of which Fernand Pisart is president and Guy F. Creveling, vice-president and secretary.

Mixing Equipment Meeting

Annual sales conference of representatives of the Mixing Equipment Co., from the Northeastern division was held on August 13th and 14th at the company plant in Rochester, N. Y., with more than a score of salesmen and executives in attendance. According to officials of the company it was one of the most successful meetings held since the formation of the company in 1923. Opening the two day session, E. S. Bissell, sales manager, extended the company's greeting to the assemblage and briefly outlined business to be discussed. The other speakers included Fred H. Gordon, Jr., president; Gordon L. Brown; Kyle A. Seabrooks; and S. C. Wagner.

New Phthalic Producer

National Aniline has brought to completion at its Abbott road works in Buffalo a new plant for the manufacture of phthalic anhydride.

This is one of the important developments in the company's plant expansion program this year, involving more money than has been spent on the plant at any time since the war.

A. C. S. Convenes at Rochester

Wilson, Harvard, Wins Pure Chemistry Award—Baxter Sees Tremendous Expansion in Hydrogenation—Drug & Chemical Section Picks Buckwood Inn—

Several thousand chemists from the U. S., Canada, and foreign countries assembled in Rochester on Sept. 6th for the 94th meeting of the A. C. S. Researches were reported in nearly 500 papers at scientific sessions sponsored by 18 divisions of the Society.

Dr. Harold Clayton Urey, Nobel Prize winner for his discovery of "heavy water," and his co-workers at Columbia announced progress in separation of isotopes. Dr. Edward R. Weidlein, president of the Society and director of Mellon Institute, pictured the influence of science on life in an address on "A World of Change" at the Eastman Theatre on Tuesday evening, Sept. 6th.

Prof. Nevil Vincent Sidgwick of Lincoln College, Oxford, a Commander of the Order of the British Empire, was one of the chief speakers at a general session. He addressed the convention on "The Uniqueness of Carbon." Dr. C. E. K. Mees of Eastman Kodak discussed "Recent Developments in Color Photography."

Preceding these speakers, Dr. Weidlein presented the $1,000 A. C. S. Award in Pure Chemistry to Dr. E. Bright Wilson of Harvard, who at 28 has accomplished "brilliant experimental work in physical chemistry, including molecular structure and quantum mechanics." Dr. Wilson's scientific address, "The Internal Motions of Molecules and Their Chemical Significance," was given before the Division of Physical and Inorganic Chemistry.

"Synthetic oil" will come into use when the prices of natural oil products climb "a little higher," was predicted by Florus R. Baxter, honorary chairman of the meeting.

Mr. Baxter, who grew up with the oil industry and who, until his retirement, was head of the laboratory of the Vacuum Oil, now Socony-Vacuum, visioned a great future for oil made by the hydrogenation of coal.

"When the prices of the products of natural oil become a little higher, and they will not have to be much higher, the production of oil by the hydrogenation of coal will become commercially feasible," he stated in a statement made public by the Rochester Section of the Society.

COMING EVENTS

Ceramic Association of N. J., Atlantic City, Sept. 16-17.
Chicago Rubber Group, A. C. S., Hotel Sherman, Sept. 24.
Laundry Owners National Association, Hotel Statler, Cleveland, Oct. 3-7.
Chicago Exposition of Power & Mechanical Engineering, International Amphitheatre, Chicago, Ill., Oct. 4-9.
National Safety Council, Kansas City, Mo., Oct. 11-15.
American Gas Association, annual meeting, Oct. 11-16.
Pa. Water Works Association, annual meeting, Atlantic City, Haddon Hall, Oct. 13-15.
Porcelain Enamel Institute, Ohio State University, Columbus, Ohio, Oct. 13-15.
The Electrochemical Society, annual meeting, Hotel Chase, St. Louis, Mo., Oct. 13-16.
Technical Ass'n Pulp & Paper Industry, Fall Convention, De Soto Hotel, Savannah, Ga., October 18-20.
American Society for Metals, Congress and Exposition, Atlantic City Auditorium, Atlantic City, Oct. 18-21.
National Pest Control Association, annual meeting, Memphis, Oct. 25-27.
N. P. V. & L. A., Convention, Cincinnati, Ohio, Oct. 27-29.
Ohio Ceramic Industries Association, annual meeting, Columbus, Nov. 5-6.
A. C. S. Ohio-Michigan Regional Meeting, Columbus, Ohio, Nov. 19-20.
American Association of Textile Chemists & Colorists, annual meeting, Bellevue-Stratford Hotel, Philadelphia, Dec. 3-4.
National Association of Insecticide & Disinfectant Manufacturers, Semi-Annual Convention, Hotel Biltmore, N. Y. City, Dec. 6-7.
Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11.
Second Annual Symposium, Division of Physical & Inorganic Chemistry, Cleveland, Dec. 27-29.
Seventh National Organic Chemistry Symposium, Division of Organic Chemistry, Richmond, Va., Dec. 28-30.
National Association of Dyers and Cleaners, Hotel Stevens, Chicago, Jan. 17-20, 1938.
Fifth International Heating & Ventilating Exposition, Grand Central Palace, New York City, Jan. 24-28, 1938.
A. C. S., 95th Meeting, Dallas, Apr. 18-21, '38.

LOCAL TO NEW YORK

Chemical Salesmen's Ass'n, Golf outing and end-of-season party, Sept. 14, Washington Irving Country Club, Tarrytown, N. Y.

Board of Trade Outing

The outing of the Drug and Chemical Section of the N. Y. Board of Trade will be held at the Buckwood Inn, Buck Hill Falls, Pa., on Sept. 17th and 18th. Two business meetings will be held in the forenoons with golf in the afternoon and the banquet on Saturday evening. Reservations should be made with the secretary of the Section, Ray C. Schlotterer.

Columbia Fellows Picked

Fellowships for graduate study in chemistry have been awarded by Columbia for the academic year 1937-38 to Edward James Mills, Jr., of 19 Irving pl., New Rochelle, N. Y.; Charles Arthur Fetscher of 230 Beach 81st st., Rockaway Beach, L. I., and Vincenzo Salvatore de Marchi of 582 E. 187th st., N. Y. City. Mills and Fetscher have been appointed Squibb Research Fellows. De Marchi is the recipient of a special fellowship provided by several silver producing companies.

The Chemical Club of Philadelphia will hold its annual golf outing on Thursday, Sept. 23rd at the Torresdale Country Club.

Industrial Chemical Demand Seasonally Slow

Few Price Changes Reported in August—Heavy Volume in Chlorine—Definite Pick-Up Expected After Labor Day—Horace W. Hooker Dead—

With the exception of products affected by the present Sino-Japanese affair the market for industrial chemicals during August was an extremely quiet one, quite lacking in important price revisions. Seasonal influences were much more pronounced than in July. The greatest vacation and travel season since the '29 period has quite naturally drawn a good proportion of buyers, executives, and sellers too, for that matter, from their desks. The result has been cautious and very limited spot purchasing and only routine ordering against existing contracts.

The above does not mean any spectacular slump in business has occurred. Actually the volume of chemicals which moved into consuming channels in July and August was larger by a rather wide margin over the corresponding period of last year, but, was of course, considerably below the rate maintained during the first quarter. The more interesting question is what will the 3rd quarter bring?

At the moment the automotive production rate is accelerating rapidly in certain plants which have successfully started on '38 models. In others production is tapering off on '37 models, but it is expected that nearly all producers will be in full swing by the 3rd week in September. An excellent 3rd and 4th quarter demand is expected, particularly in the agricultural regions, where prosperity has ceased to be just around the corner. Suppliers of electroplating chemicals report a brisk demand.

Heavy Demand For Rayon

Textiles present a mixed appearance. Rayon production in the 2nd quarter (78,500,000 lbs.) was the highest on record for the period. Full operation supplemented by new manufacturing facilities is anticipated over the balance of the year. Slight curtailment appears likely in cotton mill activity and only an unexpected spurt in sales can lift mill operations in the next 2 months up to last year's boom level.

A somewhat analogous situation exists in wool. Extensive curtailment is indicated unless a substantial volume of new business develops in the next month or so. Prices for the Spring of '38 will be announced shortly after Labor Day and these may provide the spark, but according to reports from the Boston woolen center, any prediction to this effect would be based more on hope than on signs now apparent. Strikes in the silk throwing and dyeing establishments have temporarily lowered mill consumption. July mill takings of 31,400 bales were 15% below last year and the Sino-Japanese hostilities (they are not as yet calling it war) adds uncertainties on future deliveries. Fortunately, an improved tone in labor relations is noted in the Paterson-Passaic and New England dyeing centers.

Important Price Changes

ADVANCED

	Aug. 31	July 31
Manganese ore (unit)	$0.47	$ 0.40
Zinc dust	.0915	.0890

DECLINED

None

July boot and shoe production (34,623,669 pairs) was down 3% from July of last year, but ahead of June by 0.7% In view of the large volume attained during the first half it is expected that the total in the last half will just about equal the same period of '36. Since, however, '36 production was the biggest on record the current outlook is rather promising.

Outlook In Process Fields

Tire producers, especially in the Akron area, are momentarily marking time. With a record inventory of over 12 million as against but 7-odd million last year, they appear to be in no great rush to return to more normal operating schedules and in most quarters it is expected that Akron will lag somewhat behind Detroit in returning to normalcy.

July saw the bottom probably in glass operations. Plate glass production continues at capacity levels and other divisions of the glass industry are picking up rapidly. Paper mills, particularly newsprint factories, are extremely active. Consumers are building up sizable inventories against announced higher prices for '38. Steel production is thought to be nearing the seasonal low point yet the current rate is around 83%. Production of the non-ferrous metals continues heavy.

Prices are nominal on tungsten metal and powder. Ore was advanced $2 per ton to a basis of $26 to $32 per ton. No sharp rise in antimony was reported late in August but higher prices are expected if the Sino-Japanese situation fails to improve quickly.

Seasonal items, such as chlorine, anhydrous ammonia, alums for water purification purposes, etc., are in good demand, the hot spell this summer being unusually intense and prolonged. No appreciable let-down in the demand for sulfuric has been reported and producers are still somewhat short. Copper sulfate stocks are still very scarce and August tonnage was said to be the heaviest in several years.

Egg products soared when the seriousness of conditions in China was appreciated. Myrobalans, valonia and sumac were advanced last month, while mangrove bark was off 50c a ton.

In general a definite pick-up in tonnages is expected by the trade following the Labor Day period. It is hardly to be expected that any astonishing percentage increases over last year will be made, for business activity in the last half of '36 was exceptionally satisfactory. Producers are anticipating some building up of inventories on the part of consumers. Just what items will go up and which will not no one can foretell, but there appears to be pretty general agreement of opinion that higher prices for chemicals are inevitable.

H. W. Hooker Passes Away

Horace Willard Hooker, 61, vice president, treasurer and director of Hooker Electrochemical, died Aug. 29th at his Summer home at Canandaigua, N. Y. Mr. Hooker was born in Rochester, the son of Horace B. and Susan Huntington Hooker. He was graduated from the University of Rochester in 1901.

He was first employed by the Ampere Electrochemical Co., Niagara Falls, and later went with the Development and Funding Co., of New York. He had been associated with the Hooker firm for 35 years, and had been an official for the last 25. He was a member of the Uptown Club, Chemists' Club of New York and the University Club, Niagara Falls.

Surviving are his widow, Mrs. Ruth Ward Hooker; two daughters, Mrs. Ruth Hooker Svance of New Garden, Pa., and Mrs. Jeanette Hooker Payne of New York; two sons, Horace W. Hooker Jr. of Lewiston, N. Y., and Kenneth Ward Hooker of Northfield, Minn.; a sister, Mrs. Jeanette Hooker Trimble of Rochester, and three brothers, Elon Huntington Hooker of New York, Harry M. Hooker of Rye, and Paul Hooker of Niagara Falls.

New Barium Plant

Western Barium Corp. has completed the first unit of a barium reduction and chemicals plant in Rosamond, Calif. R. A. Fredericks is president of the company.

Activated Alum's New Plant

Activated Alum (water and sewage treatment chemicals), with headquarters in N. Y. City, has taken over a building with 16,000 sq. ft. of floor space, at Curtis Bay, Baltimore, and is now in full pro-

duction. F. E. Stuart is president; A. C. Brumley is vice-president and treasurer, and Ben F. Tippins, formerly superintendent of water and sewage at Daytona Beach, Fla., is in charge of the plant.

Sulfuric Higher in England

After many years of stability in quotations for sulfuric, British manufacturers are reported to have raised prices, as of July 1st, from 5 to 7 shillings a ton. Upward trend in costs of materials and labor during the past year is said to have necessitated revised selling prices. Ocean freight rates on imported pyrites are said to have increased from 8 s. to an average of 13 s. 6 d., with a high of 16 s.

The Senate on Aug. 11th, passed a bill to permit exportation of helium for medicinal, scientific, and commercial purposes under permit from the U. S. Munitions Board.

Cheetham, du Pont Belle Manager, Goes to Wilmington

Burrell Elected Vice-President, Atlantic States Gas—Williams, du Pont Rayon Chemist, Transferred to Buffalo—Others in New Posts—

J. L. E. Cheetham, manager of du Pont's Belle plant, has been made production manager of the ammonia plants at the company's general offices at Wilmington. He will be succeeded at the Belle plant by C. H. Doherty, now assistant manager.

R. M. Evans, chemist and superintendent of production, will advance to the post of assistant manager.

Mr. Cheetham will leave Charleston as a result of his promotion. Although the changes will become effective at once, Mr. Cheetham will not change his residence to Wilmington for 5 or 6 weeks. He has been manager of the Belle plant since 1926.

Mr. Doherty has been assistant manager at the Belle plant for 8 years.

Mr. Cheetham has been prominent in Charleston's business life. He represents his company in the chamber of commerce and he is a director in the Kanawha Valley Bank.

Authority on Gases

Colonel George A. Burrell, a gas engineer distinguished during the World War for his discovery of large helium reserves in Texas, has been elected vice president of the Atlantic States Gas Co., Inc. For the last 17 months he was a director and operating manager of the company. He is also distinguished for his outstanding work on gas masks and mine safety equipment.

Williams Goes to Buffalo

Dr. T. Leigh Williams, one of the du Pont Company's outstanding chemists in the development of rayon, will be transferred to Buffalo, where he will promote important laboratory work. Dr. Williams has long been associated with the experimental station of the du Pont Company at Wilmington and was one of the outstanding members of the Brandywiners, a group interested in theatricals. He was the leading tenor of the organization.

Friend Joins International Nickel

A. J. Wadhams, vice-president in charge of development and research, International Nickel, has announced the addition of Wayne Z. Friend to the development and research staff. He will devote most of his time to technical service on corrosion resisting materials, particularly Monel, nickel and Inconel. His experience has been principally in the petroleum and natural gas industries and covers the production, refining and marketing of petroleum products, natural gas and liquefied petroleum gases.

Battelle Appointments

Battelle Memorial Institute has announced the appointment of 4 Research Associates for the year '37-8. Russell H. Lauderdale, metallurgical engineer, University of Minnesota, has received an appointment as research associate in physical metallurgy, to study certain phenomena in the grain growth characteristics of steel; Carl R. Bloomquist, M.S., University of North Dakota, will study fundamental problems involving the heats of wetting at solid-liquid interfaces as an associate in the ore concentration division; Robert P. Graham, M.S., University of Washington, has been reappointed for a second year as research associate in ceramics where he will continue the study of base exchange phenomena and John E. Dorn, Ph.D., University of Minnesota, has also been reappointed to continue studies of the solid solubilities of metals and alloys as research associate in physical metallurgy.

Dr. Alfred Clark has been made a member of the technical staff of Battelle, upon the conclusion of his appointment as research associate for the year 1936-7. Dr. Clark has been assigned to the division of applied chemistry and will work in the field of synthetic organic chemicals.

Cookson Advanced

John Ormiston, vice-president of Charles B. Chrystal Co., who has been connected with the company for 25 years retired Sept. 1st. Thos. F. Cookson, who has been sales manager, which position he will still retain, has been appointed vice-president. Mr. Cookson is well acquainted in the chemical industry, having been calling on that trade both in metropolitan N. Y. area and on the road for many years. He joined the company in '10.

Heads Manville Subsidiary

Lewis H. Brown, president, Johns-Manville, reports that E. S. Crosby has been named president of the Johns-Manville International Corp., a subsidiary. Mr. Crosby joined Johns-Manville in '28 when it absorbed Celite, of which he was vice president and a director.

Grove Moved to Chicago

W. C. Grove has been appointed manager of the Chicago office of Buffalo Foundry & Machine, manufacturers of Buflovak dryers, evaporators and chemical plant equipment. He will assume his new assignment immediately. Mr. Grove has been with the company 9 years, and for the last 6 years has been manager of the Toronto office.

Others in new connections:—C. F. H. Allen, associate professor at McGill, has become assistant superintendent of Eastman Kodak, in charge of research in synthetic organic chemistry. James H. Boyd, Jr., has resigned from Atlantic Refining to join the du Pont ammonia dept. C. O. Tongberg, formerly researching at Penn State, is now with Esso Laboratories, Elizabeth, N. J. Percy H. Walker has retired from the National Bureau of Standards to become associated with John T. Lewis & Bros. Co., a National Lead subsidiary.

Embolism Kills Schott

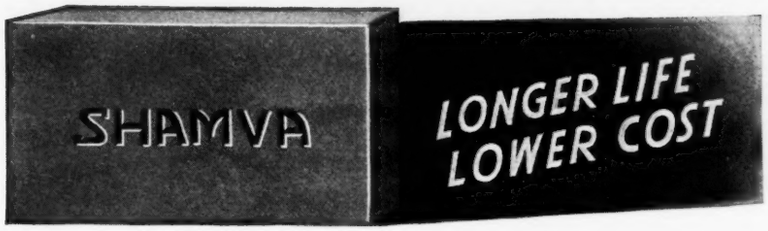
Harry Sayre Schott, 52, vice president in charge of sales and advertising of National Carbon, died Aug. 31st in a hospital of an embolism following an operation a week previously.

His first business experience was with Western Electric, which he left in 1913 to join National Carbon as a salesman in its Canadian division. He was one of the group of men associated with National Carbon, a unit of Union Carbide and Carbon Corp.

After serving as a salesman in Canada, Mr. Schott came to the N. Y. office of National Carbon and was appointed assistant sales manager. In turn, he served as division manager, assistant general sales manager and general sales manager, and 5 years ago was promoted to vice president in charge of sales and advertising.

Price, Carbide Chemist, Dies

Prof. R. C. Price, 68, noted chemist with Carbide, died at his home at Gauley Bridge, W. Va., on Aug. 25th. He was professor of chemistry at Virginia Poly for 17 years. He is survived by his widow and one son, Richard, chief chemist and assistant superintendent of the Electro-Metallurgical plant at Alloy, W. Va.



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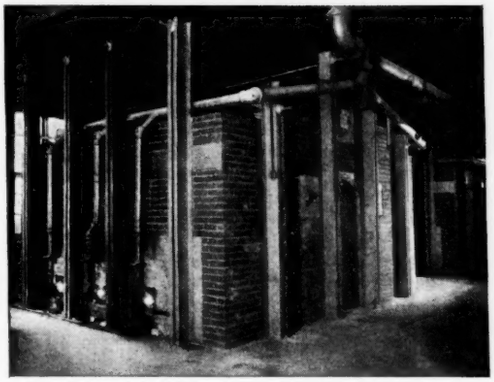

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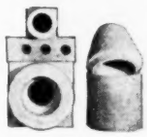

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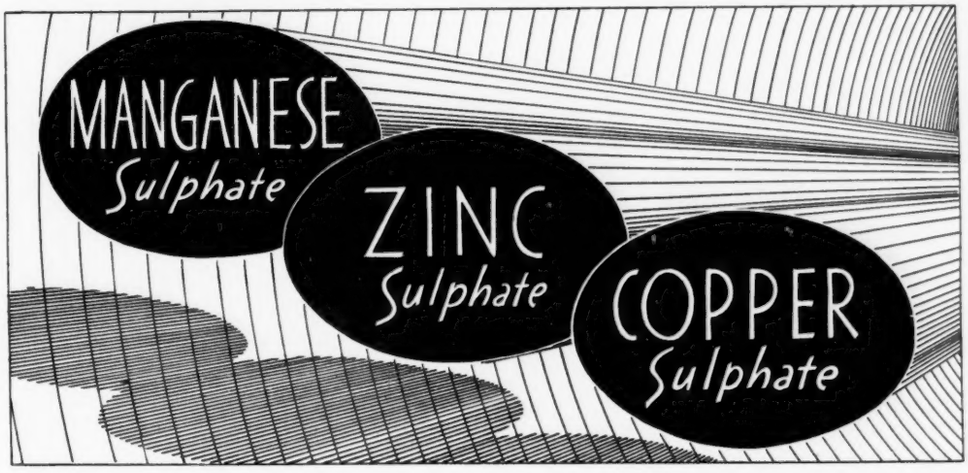

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Sherka V.-P. Dies

Frank E. Layman, 54, vice-president, Sherka Chemical, Bloomfield, N. J., died Aug. 13th, in Middletown, Conn. Mr. Layman was born in Sandusky, and was educated at Ohio State. Previous to his connection with Sherka he had been with Cutler-Hammer, and Bakelite.

McDonough in Europe

Francis J. McDonough, N. Y. Q., sailed July 19th in the *Bremen*. Mr. McDonough plans to spend 6 weeks in Europe.

Now Prof. William Rea

William Rea, N. Y. City advertising counselor to several important companies in the chemical field, has been appointed to teach courses in elementary and advanced copy at Pace Institute during the coming fall and winter. He was formerly with B. B. D. & O., and also Erwin, Wasey.

Larger Bromine Production

Operation of the Ethyl-Dow Chemical company's bromine extracting plant at Kure Beach on double capacity schedule began late last month.

Ansul Chemical Expands

Plans for a new factory for Ansul, Chemical, Marinette, Wisc., have been approved by the state. Building is to be two stories, of masonry construction.

Danco Appoints La Pine

Gerard J. Danco, Inc., essential oils, chemicals and drugs, N. Y. City, appoints Arthur S. La Pine & Co., Chicago, as its representative for the Middle West. Address is 114 West Hubbard st., Chicago.

Seibel Given Degree

Texas Technological College, Lubbock, has conferred an honorary doctor of science degree on C. W. Seibel, supervising engineer of the U. S. Bureau of Mines helium plant at Amarillo, Texas.

Awards Women's Scholarships

Award of 3 women's graduate scholarships in chemistry totaling $1,200 is announced by the Women's Service Committee of the A. C. S., of which Lois W. Woodford of the American Cyanamid Company Laboratories, Stamford, Conn., is chairman.

Scholarships, provided by Francis P. Garvan, president of the Chemical Foundation went to Clara M. Szego of N. Y. City; Miriam Straus of Cleveland; and Mary F. Bates of Detroit.

Cream of Tartar Advanced to 19¾¢

Increases in Other Tartars Likely—Sino-Jap Situation Causes Price Advances in Many Items—Mercury Reduced to $92—Lindsay Dead—

The upward movement in tartars was resumed last month when another dollar per kilo was added to the price of argols. While the only announced advance was one of a cent on cream of tartar, bringing the base quotation up to 19¾c, other items in the group, including tartaric acid, Rochelle, etc., bear close watching.

The strong position of cadmium metal continues unabated and two salts, cadmium bromide and the iodide were raised, the former 25c per lb. and the latter 37c. The Sino-Japanese crisis caused a sharp advance in ephedrine compounds. Competition was blamed for a 35c reduction in mandelic acid and one of 55c in sodium mandalate. A stronger tone in menthol was noted and a 5c advance was reported in the final week. The extremely hot, muggy weather in August was responsible for an excellent volume of business in citric and tartaric acids. The manufacturer of mannitol has placed a 3c reduction in effect and the current price is now $1.45 per lb.

Mercury metal weakened slightly last month and quotations of $92 were reported in the trade. The decline had no effect on the mercurial price schedules.

Little change has taken place in the glycerine situation. Price stability continues with spot stocks none too plentiful. An excellent demand exists for alcohol for industrial purposes with prices steady.

With Spain out of the market as a supplier of mercury, production in Italy has almost doubled since the beginning of the current year, according to advices from Rome. Production during the first quarter was provisionally reported at 571 metric tons against 310 in the corresponding months of '36 and exports increased from 270 tons to 424 tons. U. S., which formerly obtained the bulk of its mercury imports from Spain, was Italy's largest single customer in the first quarter.

Important Price Changes

	Aug. 31	July 31
ADVANCED		
Argols, kilo	$32.00	$31.00
Cadmium Bromide	1.86	1.61
Iodide	4.02	3.65
Ephedrine Alkaloid	2.60	1.00
Hydrochloride	2.25	1.00
Sulfate	2.25	1.00
Cream of Tartar	.19¾	18¾
Menthol	4.25	4.20
DECLINED		
Acid Mandelic	$ 2.05	$ 2.40
Mannitol	1.45	1.48
Mercury	92.00	94.00
Sodium Mandalate	3.20	3.75
Sulfanilimide	2.00	2.65

Smaller Sales American Iodine

Sales of American-produced iodine in '36 totalled 233,925 lbs., valued at $212,636, a decrease of 6% in quantity and 14% in value, compared with 1935 sales, and not much more than half as great as during the peak year '33 when sales rose to 401,525 lbs., valued at $669,289. In '33 average sales value was $1.67; in '36 it was 91c.

Exposition Plans Reported

Practical use of titanium and zirconium in the chemical fields is relatively new, but one exhibit at the Exposition will be devoted to showing some recent applications. Featured will be the metals themselves, their salts, oxides, and silicates. Interesting applications of the products include opacifying vitreous enamels, manufacture of welding rod fluxes, and processing ceramic bodies and glaze work.

Principal sections of the Exposition will include chemical products and raw materials; general plant equipment; processing machinery; pumps, piping, hydraulic accessories; materials handling equipment; containers and packaging; laboratory equipment and supplies; instruments of precision; metals and alloys; brewing, distilling and bottling; synthetic plastics.

New Camphor Process

It is reported that the research laboratory of the Japanese Department of Finance has developed a successful process for the production of synthetic camphor. Industrialization of the process, details of which are being kept secret, is now under consideration.

Charles R. Lindsay, Jr., at 63

Charles Rogers Lindsay Jr., 63, prominent chemical manufacturer, died Aug. 7th after an illness of 6 weeks with a streptococcus infection.

Mr. Lindsay was president of Lindsay Light and Chemical of West Chicago. Company was organized by him in Chicago in 1895 and was removed to West Chicago 5 years ago.

When the U. S. entered the world war, Mr. Lindsay organized a field service unit and served as an inspector of the American Red Cross with a commission as a captain in the army. He was a member of the Tavern club, the Dunham Woods Riding club, the Geneva Golf club and the Chevy Chase Country club of Washington, D. C.

Surviving him are his widow, Mrs. Dorothy Lindsay, who has been prominent in Girl Scout work and is regional director of the Great Lakes area; a son, Charles L. Lindsay III, of Wayne, and a daughter, Mrs. William V. Berg.

Foreign Trade in Coal-Tar Chemicals Expands in '37

Both Exports and Imports Expand in First Half—June Coking Operations Up—Prices Steady—Good Demand For Cresylic—

American foreign trade in coal-tar products increased substantially during the first half of the current year and despite a 33% gain in imports the U. S. maintained a favorable balance of trade in lines of such finished products. Total exports of American coal-tar products, both crude and refined, were valued at approximately $8,013,000 during the first half of the year against $7,425,000 in the corresponding months of '36.

Shipments of finished products, including dyes, colors, stains, intermediates, rubber compounding agents and the like increased around 14% compared with the first half of '36, or from $4,985,000 to $5,697,000. In this classification, dyes, colors, stains, etc., increased in value from $3,667,000 to $3,849,000, according to preliminary statistics, which show that while China, Canada, Japan, British India, Belgium, the Netherlands, Germany, Mexico, and Argentina are our outstanding markets for such products, shipments are now going forward regularly to more than 50 foreign countries.

U. S. exports of coal-tar crudes declined somewhat during the first half of the year—total aggregated $2,316,000 against $2,500,600 in the first 6 months of '36—due to smaller shipments of crude coal-tar, pitch, and certain other crudes.

Imports of coal-tar products into the U. S. were valued at $9,361,000 in the first half of the current year compared with $6,943,000 for the corresponding months of 1936. More than half of the total consisted of creosote oil and other crudes.

Receipts of finished products gained approximately 35% in value during the current period compared with the first half of 1936, or from $3,581,000 to $4,813,000, with practically every major item making up the trade sharing in the gain. In this classification imports of coal-tar dyes, colors, stains, and similar products increased from 1,604,000 to 1,860,500 lbs. in quantity and in value from $2,315,000 to $2,890,000. Most of these items consisted of small-lot quantities of special lines and were supplied by Germany and Switzerland.

Other coal-tar imports recording gains compared with the first half of 1936 included acids, receipts of which increased from 248,000 to 381,000 lbs.; and other intermediates, from 700,000 to 1,334,000 lbs.

Both production and stocks of coke increased during July. Daily rate of output from byproduct and beehive plants, amounting to 153,611 tons, was 6.2% greater than the June rate of 144,692 tons, and was 23.7% above the rate prevailing in July a year ago.

Output of byproduct coke for July was 4,422,106 tons, an average per day of 142,649 tons. Compared with the June rate there was an increase of 6.3%, all of this gain being attributable to resumed activities in the iron and steel industry. At furnace plants the daily rate advanced 10.0% while at merchant plants a decrease of 3.2% was reported. Two plants, closed down throughout June, resumed operations. One other plant put into operation a battery of 73 new ovens.

Stocks of coke at byproduct plants continued to rise, total on hand at the close of July amounting to 2,008,552 tons, 9.0% in excess of June reserves. Bulk of the increase was at merchant plants, where stocks advanced 11.7%.

Tar Production Down in June

Output of tar in June was 51,281,024 gals., against 57,048,211 in May and 47,168,959 in June a year ago. For the first 6 months, total was 327,127,378 gals., against 263,151,772 in the same period a year ago. Light oil production was 16,842,864 gals., against 17,747,053 in May and 15,485,672 in June a year ago. In the first half of '37 total output of light oil reached 107,442,513 gals., against 86,430,209 in the same period a year ago. Ammonia sulfate, or its equivalent, was recovered to the extent of 64,093 tons, against 71,903 tons in May and 58,858 tons in June a year ago.

Little "summer dullness" was apparent in the coal-tar chemical markets in August. Cresylic acid stocks are still low. Phenol is moving out to the plastics industry in excellent volume. Benzol shipments for blending purposes are seasonally heavy. There is a good movement of creosote due to the increase in railroad maintenance work undertaken this summer and the continuance of a large volume of heavy construction work.

Spot stocks of the principal coal-tar solvents are still scarce despite the fact that a temporary decline in lacquer and coatings consumption in the Detroit automotive area has taken place. Heavy inquiries from the Far East have been reported.

Prices remain steady. The consuming industries appear to be able to take all the additional production of coal-tar chemicals that an 80-85% steel activity represents, and in fact, definite shortages in many items still persist.

Coal-Tar Chemicals

Call for dyes was spotty last month caused by major labor troubles in the principal dyeing centers, which, fortunately, now appear to be definitely settled. Shipments of intermediates, on the other hand, were in excellent volume with dyemakers anticipating a good demand from the textile and tanning fields in the last half of the year. Of special interest was the entrance of a new phthalic anhydride producer into the field.

Germany Forces Production

With a view to enforcing maximum recovery of valuable products particularly phenol, cresols and naphthalene the competent German trade control board has further intensified the official regulation of the coal-tar derivative trade.

Under the latest decree, all coal-tar distillation plants are required, under precise official regulations to produce maximum possible amounts of phenols, cresols and naphthalene from their output of light and medium tar oils. If the distillation plants producing the oils are not equipped to recover the cresols and phenols, they are then required to deliver the oils without delay to other officially recognized plants provided with suitable recovery equipment. Decree in question also endows the trade control authorities with extensive powers for compelling the realization of the decree's purpose, such as regulation of wholesale distributors, examination of accounting records, and ascertainment of output of raw-tar and distilled products.

Calco Cooperates on Odors

As the result of a series of conferences during the past two months between County Solicitor Edmund A. Hayes and Colonel W. S. Weeks of Calco Chemical, Bound Brook, N. J., in regard to the obnoxious odors alleged to emanate from the Bound Brook plant, company has agreed to permit the Board of Freeholders to designate an agent to investigate the odors in the plant.

Company has further agreed to pay one-half of the wages of the agent provided the county can make some arrangement to meet the balance of the cost. In view of this cooperation, Solicitor Hayes has written the City Commissioners and the Borough Council of Highland Park, requesting that they join the county in sharing the cost.

"We are satisfied that Calco is doing everything possible to combat the odor nuisance," said Mr. Hayes. "It does not admit that it is entirely responsible for the odors and it has offered to open the plant to us and permit a research expert prove to them that it is to blame for the odors."

Pigments and Fillers

New Cellophane Plant

Du Pont has completed purchase of 400 acres of land at Clinton, Ia., and shortly will begin construction of a cellophane plant. Project is expected to cost several million dollars. When completed, the new unit will increase to 8 the number of du Pont cellophane plants, and will be the first west of the Mississippi.

Direct Acetic Plant

Work has started on the direct acetic acid unit at Newberry Lumber and Chemical's plant at Newberry, Mich., it was recently announced by Supt. P. S. Hamilton. Construction of the new unit, replacing the acetate plant, is being made possible through the allocation of a loan from the Reconstruction Finance Corp., the total amount borrowed being $315,000. Of this amount $125,000 will go into the plant construction. $141,000 will go for delinquent taxes in Alger, Luce and Chippewa counties and the balance, $48,000, will be used for working capital.

Du Pont's Bisulfide Plant

Du Pont will erect a $750,000 carbon bisulfide plant near Petersburg, Va. It will be operated as the Old Hickory Chemical Co. The du Pont Co. is a large consumer of carbon bisulfide in rayon manufacture.

German Naval Stores

Latest measure undertaken by the German Government to reduce consumption of naval stores has been placing the delivery and purchase of naval stores subject to prior official approval by a competent official trade board. Items included in the control measure are all gum and wood products of the naval stores industry besides liquid rosin and its by-products.

Porcelain Institute Forum

Plans for the Second Porcelain Enamel Institute Forum at Ohio State University on Oct. 13-15th, are rapidly nearing completion, according to F. E. Hodek, Jr., of the General Porcelain Enameling & Mfg. Co., Institute vice-president in charge of this activity for the second time. Mr. Hodek and his committee, at a recent meeting outlined the program for this second Forum, and are now negotiating with authorities in their respective fields for adequate presentations of the subjects chosen.

Nat. Lead Insurance Plan

National Lead has provided $18,000,000 of group life insurance for its 5,000 employees, company and employees sharing cost. Plan was underwritten by Metropolitan Life.

Lead Pigments Advanced, First Rise in 4 Months

Corroders Accepting Orders Only to Sept. 30th—Construction Total Up—June Paint Sales $41,656,085—Paint Exports Expand—

Four months of lead pigment price stability were ended last month when two separate advances of ¼c were placed in effect for red lead, litharge, and orange mineral, and producers of dry white lead announced a ½c advance effective Aug. 31st. The statistical position of lead is excellent and any further sizable increases in demand are almost sure to be reflected in still higher price levels. Stocks at the end of July were the lowest since January, '31. Corroders are only accepting orders up to Sept. 30th. They will not take business for 4th quarter delivery.

No change was noted in the zinc oxides, but the statistical position of the metal is likewise excellent. Production is barely keeping up with shipments Galvanizing operations are up 18% above last year. The red cadmium selenides were advanced 25c per lb. in the middle of last month and a 20c increase was noted in cadmium sulfide.

With the July record, once again, construction has established a new high level for the recovery. According to F. W. Dodge Corp., July total for all classes of construction amounted to $321,602,700 in 37 eastern states, topping the previous high figure of the recovery reported in June of this year in the amount of $317,842,100 and representing an increase of 8% over the total of $294,734,500 reported in July 1936.

June sales of paint, varnish, lacquer and fillers totaled $41,656,085 in value, against $45,254,635 in May and $40,464,806 in June last year. Total sales for the first half of the year were $235,058,533 against $197,770,975 in the same period of '36. Trade sales as classified by 580 of these establishments were $22,348,182 in June against $23,206,972 in May and $22,412,299 in June last year; industrial sales were $15,343,359 against $16,785,249 in May and $14,541,069 in June last year. Lacquer sales in the second quarter of '37 totaled 13,066,499 gals. against 11,404,989 in the first quarter of '37 and 12,071,087 gals. in the second quarter of 1936, according to the reports made to the Census Bureau by 158 manufacturers.

Definite signs of revival were noted in the final week of August in the market for raw paint materials. Paint manufacturers are preparing for an active fall season, anticipating the best 3rd quarter since '29.

Important Price Changes

ADVANCED

	Aug. 31	July 31
Cadmium selenide, light	$ 2.25	$ 2.00
dark	2.75	2.50
Cadmium sulfide, orange	1.50	1.30
Litharge	.08	.07½
Red lead	.09	.08½
Orange mineral	.12	.11½
White lead	.08	.07½
Sulfate, basic	.07½	.07

DECLINED

None

Exports $10,792,500

U. S. exports of paint products have recorded steady gains during the past 5 years and today quantities being shipped as well as aggregate values being received are more than double those recorded in depression years.

Exports of such products in the first half of the current year aggregated $10,792,500 in value, which compares with $8,200,600 in the corresponding period of '36; $7,861,000 for the first 6 months of '35; $6,622,000 in '34; and $4,834,400 for the first half of '33.

Foreign demand for American ready mixed paints, varnishes and lacquers, continued especially good in the first half of the current year. Shipments were valued at $4,130,000 during the period against $3,398,500 in the first half of '36. In this classification exports of lacquers increased from 791,000 to 986,000 gals.; ready mixed paints from 1,125,000 to 1,381,355 gals.; and varnishes from 210,335 to 241,000 gals. Distribution of these products has been very wide this year, and more than 100 foreign countries are now taking regular monthly shipments of American paints, varnishes and lacquers.

Other items on the paint product export list which recorded gains in the first half of the current year, compared with the corresponding period of 1936 included bituminous paints, shipments of which increased in value from $110,700 to $160,000; paste and semi-paste paints, from $154,400 to $200,500; and cold-water paints from $183,000 to $261,000.

U. S. exports of chemical pigments increased from 75 to almost 98 million lbs. during the periods under review, but shipments of mineral earth pigments to foreign markets declined from 19,617,000 lbs. in the first half of '36 to 17,000,000 lbs. in the corresponding period of the current year.

Spanish potash properties, including mines and warehouses, have been taken over by former employees and are being operated on a "collectivized" basis. Spain's most important potash mines are located in the neighborhood of Barcelona which is in the territory now under control of the Valencia government.

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Human highjackers aren't the only hazards shippers and carriers have to fear. Public Enemy No. 1 among product-pirates is the *imperfect* closure; the *leaky* closure that wastes profits, invites substitution, ruins reputations. Drums equipped with the PLUS-Guard of the Tri-Sure Closure . . . the tamper-proof, leak-proof, *triple*-sealed closure with the patented flange, plug and seal . . . enjoy 3-way protection from departure to arrival. And protect the carrier against damage claims! Be sure with Tri-Sure!

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will be paid by the AMERICAN FLANGE & MANUFACTURING CO., INC., to anyone in the U. S. A. or Canada causing arrest and conviction of persons unlawfully removing genuine Tri-Sure closures and seals, with intention of committing a felony. Suitable reward will be paid in other countries.
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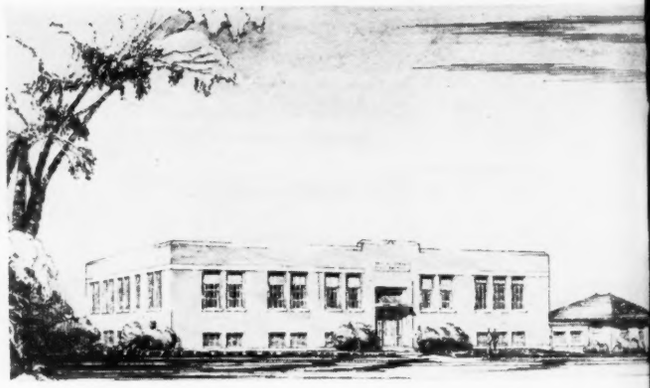
CHEMICAL

The Photographic Record

Amateur photographers! The first five dollar award goes to Stephen Tyler, who submitted the first photograph for these pages. It's the ultra candid shot of Williams Haynes at the Dorr party, imbedded in the middle of the picture of that festive event.

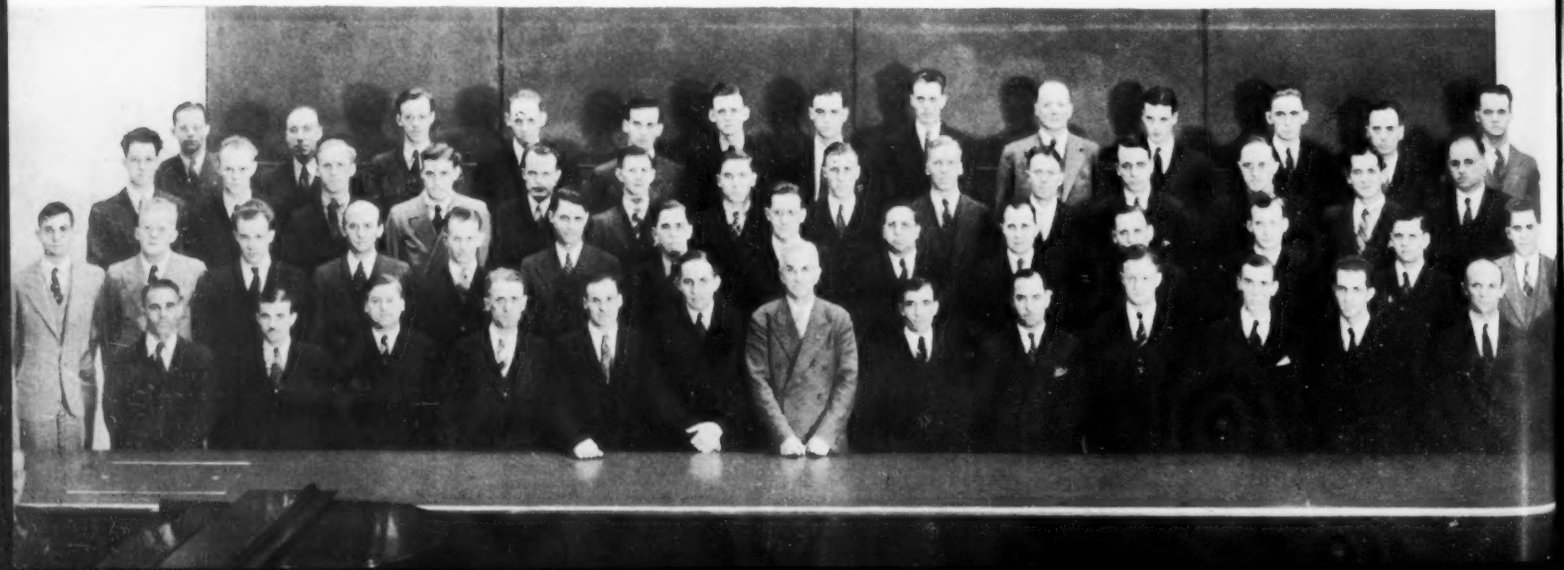
Whether taken with a Brownie or a Leica, we invite you to send good, clear snapshots of chemical people and chemical processes for our picture pages. The best one each month wins a five dollar prize.

Twenty years without a lost time accident—James E. Murphy and Guy P. Childress of the Westvaco South Charleston plant have completed twenty years of such enviable service. Both are married, both have seven children; Murphy is a carpenter whose hobby is church work, and Childress is an operator in the caustic department whose hobbies are hunting and gardening.



Two new Milwaukee plants of chemical interest—above, Chain Belt Company's new building which houses the machine shop and the West Milwaukee offices. Below, new home of Hackney steel drums and cylinders—the office building and plant.

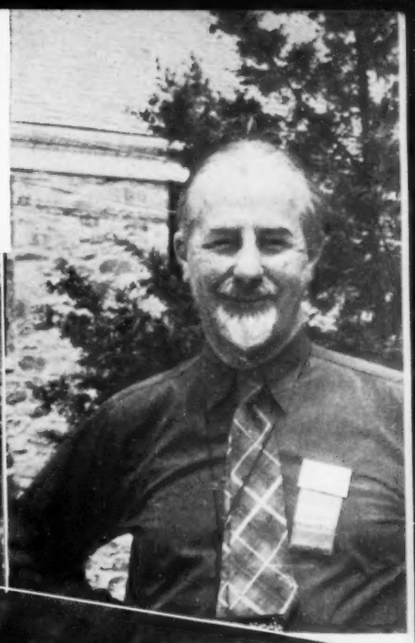
Dow plant and office men organized last Fall the Dow Male Chorus and have already given four recitals. Director is J. Harold Powers.

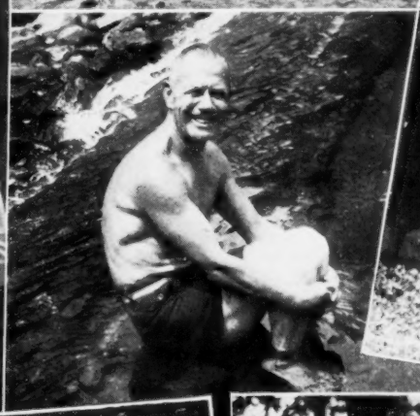


NEWS REEL

of Our Chemical Activities

Dorr gives a party. Housewarming at their new Old Mill research laboratories, July 30.





STANDARD BICHROMATES

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Natural Raw Materials

Imports of Raw Materials Rise Sharply in First Half

Turpentine Declines to Record Low of 31½c—Shellac Still In Doldrums—Chinawood Prices Nominal—Japan Wax Up—

Notwithstanding the easing in imports into the U. S. of chemicals, drying oils, drying oil seeds, and related products during May and June, receipts during the first half of the current year were almost 42% greater on a value basis than in the first 6 months of '36 and were only 20% under the level recorded in the first half of '29.

While some of the value gain recorded in the current year was due to higher price levels, major part resulted from heavier receipts of raw and semi-manufactured materials required by our paint and varnish industry, and a number of other items including waxes, fertilizer and medicinal materials, essential oils, and the like, some of which recorded quantity gains up to 200% and better, compared with the first 6 months of '36. Perilla oil and casein were the only important items on the list that recorded losses.

Total value of such imports during the first half exceeded $119,000,000 which compares with $84,000,000 in the corresponding months of '36 and $148,000,000 in the first half of '29, during which period an all time record was established.

Compared with the first half of '36 imports of materials used mainly in the manufacture of paints, varnishes and lacquers increased about 52% in value, or from 25 to 38 million dollars. In this group receipts of varnish gums advanced from 34 to 55 million lbs.; flaxseed from 6,823,000 to 17,554,000 bu.; and tung oil from 83 to 96 million lbs. Imports of perilla oil, however, declined from 81 to 18 million lbs.

Rosin Up, Turpentine Down

Export sales of turpentine have been quite disappointing. A few sizable orders have been placed for South American destination, but the unsettled state of affairs in the Far East has been felt in the inquiries received in the primary centers. Quite a few place the blame for the drop in turpentine to the lowest price in years to rumors that the Government was contemplating unloading holdings. There was little to confirm this theory. It is reported that quite a few tank cars were taken at the 31½c level.

About 50% of the crop remains to be marketed. Holdings at interior points are reported quite large, but on the other hand, some decline in early production estimates have been made due to labor troubles in certain sections.

Stocks Low at Primary Points

Rosin prices staged a mild recovery last month but turpentine continued to sink lower, closing out the month at 31½c at primary ports as against 33c at the end of July. Naval stores presents a very perplexing picture. Rosin stocks at Southern ports are 20% below last year, while stocks of turpentine are 9% lower. On the other hand, production during the current season may run 10% above last year. It is difficult to put the finger on the cause of weakness. For several months higher prices have been looked for but in the main have not been forthcoming. Instead, further weakness, more pronounced in turpentine than rosin, has occurred. In many quarters the opinion is expressed that the turn is about to occur and the modest rise in nearly all grades of gum rosin in the past 30 days is a definite indication as to the immediate future trend of the market.

Important Price Changes

ADVANCED

	Aug. 31	July 31
Albumen	$ 0.80	$ 0.72
Gum copal Manila, Loba:		
A	.10¼	.10⅛
B	.10¼	.09¾
C	.10¼	.09⅜
D	.09⅜	.08¾
Egg Yolk	.57	.54
Myrobalans J1	29.00	27.00
J2	20.50	19.50
R2	20.00	19.00
Sumac	60.00	58.50
Valonia Beards	48.00	46.00
Cups	34.00	33.50

REDUCED

Gum dammar, Batavia A/E	$ 0.15¾	$ 0.16⅛
Mangrove bark	25.00	25.50

	July 30	Aug. 27	Net Gain or Loss
Savannah:			
B	$7.80	$7.80	.....
D	7.80	7.85	+$0.05
E	7.80	7.85	.05
F	7.80	8.00	.20
G	7.80	8.00	.20
H	7.80	8.00	.20
I	7.80	8.00	.20
K	7.80	8.00	.20
M	7.80	8.00	.20
N	7.85	8.05	.20
WG	7.90	8.20	.30
WW	8.60	8.80	.20
X	8.70	8.80	.90
Stocks	73,820	64,982	—8,838
Turpentine	.33	.31½	—.01½
Stocks	33,326	34,525	+1,199
Jacksonville:			
Rosin stocks	33,839	27,418	—6,421
Turpentine	31,974	28,132	—3,842
Pensacola:			
Rosin stocks	27,644 (July 30)	25,717 (Aug. 21)	—1,927
Turpentine	19,511 (July 24)	22,450 (Aug. 21)	+2,949

Light Trading in Shellac

Shellac markets failed to become more active in the period under review. Prices are at the lowest level in several years, yet purchasing has failed to materially improve. Some slight flurry occurred recently when the more serious nature of the Japanese operations were more generally realized. The dangerous situation arising from the attack on the British ambassador to China has at least called attention to the fact that shellac is an imported item and would be subjected in case of war to considerable difficulties as to the matter of adequate and regular supplies.

Movement in the varnish gums was mixed last month. Lobas A, B, and C in the Manila group are now on a uniform price basis of 10 1/4c with the usual differential for smaller quantities. This represents an increase of 1/8c for A, 1/2c for B, and 7/8c for C. D was "upped" 5/8c to 9 3/8c. Standard dammar A/E Batavia was off 3/8c, with the new basis 15 3/4c.

Outstanding development in the waxes was the price recovery of Japan wax. Only ample spot stocks in this country prevented the market from going still higher. Consumers are watching Far East developments closely. Any prolonged struggle or any increase in the sphere of activity may lead to further advances.

Oils of Oriental origin were sharply higher in the past 30 days in contrast with the generally lower levels for nearly all domestic oils and fats. Quotations on Chinawood were strictly nominal and higher prices were being quoted for competing oils, including oiticica and perilla. Stocks of Chinawood are none too large, despite large importations in June and July. One deterring effect to higher prices is the prospect of large tonnages of cottonseed oil and lard. With a cotton crop estimated at 15,600,000 bales, a cottonseed oil production of 3,800,000 bbls. is in prospect. Stocks are 20% above the corresponding period of last year and lard stocks are well above the average, but should decline with reduced hog slaughter. Nevertheless, larger production seems more than likely.

The Government's Aug. 1st flaxseed crop estimate of 8,014,000 bu. was 400,000 bu. above the July 1st total, but was 30% below the '30-'34 average. The conflict in the Far East may cut off supplies of competing oils to such an extent as to increase materially the consumption of linseed.

The huge corn crop will increase the supplies of corn oil and prices have lately been reflecting this condition. Competing oils have been reduced. Lower copra prices are reflected in an easier tone for coconut and crude was available for October, December delivery at 4 3/8c in tanks as the month closed.

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A biennial event of great significance to chemists, engineers and operating executives takes place in New York . . . the Exposition of Chemical Industries.
This year the 16th of these outstanding industrial events will be a brilliant pageant of exhibits embodying the progress which has been made in methods, equipment and materials. An attendance of over 40,000 is forecast.
To assure that you are up-to-date on production methods and equipment . . . to make sure you know about the many new materials, and new uses for old materials, plan NOW to attend.
Note the date . . . Dec. 6-11
Note the place . . .
Grand Central Palace, New York
COME AND BRING YOUR ASSOCIATES!
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Solvents and Plasticizers

Light Demand for Solvents in Mid-West Area

Petroleum Thinners Down ½c at Bayonne—Commercial Solvents Takes Over Industrial Alcohol Business of American Commercial Alcohol—

Trading in solvents has been extremely light for the past 60 days. Curtailment of activities in the Detroit automotive and the Akron tire and rubber centers has had a decided effect on volume. Retooling operations in the automobile field are likely to end by the middle of September. It is expected that the lacquer and synthetic coatings makers will step up operating schedules shortly to provide for a 3rd quarter production of approximately 850,000 to 1,000,000 units. Resumption of better schedules in the rubber field may lag somewhat in view of the inventory of some 12 million tires.

A reduction of ½c was noted in the tankcar quotations for petroleum thinners at Bayonne, N. J., and other refinery or distributing points in northern New Jersey. Prices are now based on 9½c in the Newark, N. J., and metropolitan area of New York. The decline in tankcar prices forced a revision in tankwagon schedules and this price is now 10½c for 200 gals. or more in one delivery. In addition, reductions of ½c in tankwagon quotations in the New York area only were reported in rubber solvents and V. M. & P. naphtha. Likewise a ½c decline was noted in the latter material in Philadelphia.

Routine trading was reported in acetone, butyl alcohol, butyl acetate, ethyl acetate, and all of the phthalates. Spot stocks of the latter are still rather difficult to obtain. Prices of all these items remain firm and unchanged. Ethyl cellulose is quoted at 70c in 50 lb. lots, 75c in 100 lb. lots, and $1.00 per lb. in smaller quantities, f. o. b. plant, with freight allowed.

No tax on blackstrap molasses used for the production of alcohol is proposed in the Jones sugar quota and taxing bill, which was passed by Congress and sent to the President on Aug. 20th.

Solvents Expands Alcohol Sales

Russell R. Brown, president of American Commercial Alcohol, announced Aug. 31st that the corporation and its affiliate, American Distilling, but not Kessler Chemical, had agreed to transfer all of their business and good-will in the sale and distribution of industrial alcohol to Commercial Solvents Corp., together with all permits for the use of industrial alcohol lodged with them.

Personnel of the industrial alcohol sales division of American Distilling will join Commercial Solvents' organization. All 4 plants of American Distilling will be continued in operation and owned as heretofore and industrial alcohol will be produced at the Philadelphia and Sausolito (Calif.) plants to supply requirements of Commercial Solvents.

Puffer With Commercial Solvents

Bruce Puffer, formerly sales manager of the industrial alcohol division of American Distilling, has joined the sales department of Commercial Solvents, as a result of the recent transfer.

In 1920, because of his proven sales ability, he was selected to establish a branch office in Minneapolis for U. S. I. Later on, he was made manager of this company's office in St. Louis and was afterwards transferred to Cleveland. He

BRUCE PUFFER

remained with U. S. I. until '28, when he left for Detroit to join the sales organization of Forbes Varnish, Cleveland, Ohio.

When American Commercial Alcohol was formed in '29, he became assistant sales manager of this organization, covering the territory from Cleveland east, with headquarters in Philadelphia. In '32, he was appointed sales manager of the industrial alcohol division of American Distilling, a subsidiary of American Commercial Alcohol, and moved to N. Y. City.

Exports of Plastics

The U. S. plastics industry which has made such rapid progress in recent years, and which is sometimes referred to as one of our "depression babies," is now devoting renewed attention to the export field. Exports for use abroad mainly in the manufacture or fabrication of a thousand and one products, aggregated 9,500,000 lbs., valued at $3,413,000 in the first half of the current year against 6,245,000 valued at $2,248,000 in the corresponding months of '36, a gain of more than 50% both in quantity and in value.

Pyroxylin plastic film support, also known as "Celluloid" film base, led the export list in this group with shipments aggregating 1,985,600 lbs. valued at $1,681,000 in the first half of the year which compares with exports of 1,186,000 lbs. valued at $1,073,000 in the corresponding months of '36. While exports of this product are well distributed the bulk goes to the United Kingdom, Canada, and Japan.

Larger Output Cellulose Plastics

Production of cellulose plastic products during the first half of 1937 totaled 17,777,812 lbs. compared with 13,176,224 during the same period of '36, according to data compiled by the Bureau of the Census.

Oil Conservation Measure

President Roosevelt signed on Aug. 12th, the oil states compact measure extending agreement to conserve oil and gas for an additional two years beyond Sept. 1, 1937, date on which it was to have expired.

Russell Advanced

R. P. Russell has been appointed executive vice-president of Standard Oil Development and, under F. A. Howard, president, will assume general executive responsibility. Standard Oil Development is a subsidiary of the Standard Oil of N. J. It conducts or supervises the major part of the research and development work for Standard of N. J., and provides laboratory service for the company's subsidiaries, Colonial Beacon Oil, Standard Oil of Louisiana and Standard Oil of Pennsylvania. Company also announced that Dr. N. E. Loomis has been appointed vice-president in charge of research and development. R. H. Dickson has assumed the duties of general secretary.

McGovern Recovers

James P. McGovern, general counsel of the Industrial Alcohol Institute, has recovered from a heat prostration.

New Resin Firm

Organization of the Shawinigan Resins Corp., and purchase of 9 acres of land from the Indian Orchard company adjacent to the property of the Fiberloid Corp., was announced recently by Fiberloid. New organization will manufacture base chemicals used by Fiberloid.

German Production Expands

Value of the production of the German chemical industry during the past year was $1,750,000,000, according to the German Institute for Business Research. This was $210,000,000 more than in '35. Industry now employs 220,000.

Agricultural Chemicals

Bear With Country Home

Dr. Firman E. Bear has been appointed scientific editor of the *Country Home* magazine published by Crowell Publishing. He was formerly director of agricultural research of American Cyanamid, and previous to that was professor of soils at Ohio State.

New Los Angeles Firm

George P. Gray, formerly chief of the division of chemistry of the California State Dept. of Agriculture, has acquired an interest in the firm of J. A. MacDonald, Inc., a Los Angeles fertilizer company. He will act in the capacity of secretary and will have general supervision of the production of fertilizers. Mr. Gray recently returned from Honolulu where he was directing chemical investigation of methods of control of the Mediterranean fruit fly and melon fly for the U. S. Dept. of Agriculture.

Davison Installs New Machinery

Davison Chemical has awarded a contract for installation of new machinery to produce granulated superphosphate and mixed fertilizers, buildings for the storage of bulk and bagged material, machinery for screening, conveying and loading of railroad cars, and alterations in the materials handling system for the unloading and storage of phosphate rock and other products, to Koppers' Bartlett Hayward division, Baltimore.

Burns & Co. Formed

L. D. Burns & Co., new fertilizer brokerage firm, has opened offices in the Rhodes-Haverty Bldg., in Atlanta. Partnership, consists of L. D. Burns, L. D. Burns, Jr., and B. Boyd Hartley.

L. D. Burns, who resigned on July 1st as vice-president and director of Ashcraft-Wilkinson, has been connected with that organization since its founding 25 years ago. Mr. Hartley was for 12 years associated with Ashcraft-Wilkinson as traffic manager, and, like the other partners, has a wide acquaintanceship in the fertilizer industry.

Huntington, Cyanamid, Returns

Warner D. Huntington, director of fertilizer sales, American Cyanamid, has just returned from a trip to Europe. John B. Abbott, director of agricultural research, will arrive August 26th in the *Empress of Britain*. Mr. Abbott attended the Fourth International Grassland Conference at Aberystwyth, Wales, and later toured Europe with a party of American agronomists.

Routine Trading In Raw Fertilizer Materials

Decline in Cottonseed Meal Forces Lower Quotations in Organic Ammoniates—Superphosphate Advanced 50c—July Tag Sales Up—Exports Increase 18% in Tonnage—

Actual tonnages of raw material booked, aside from sulfate and nitrate, in the past month were extremely small. Traditionally the current period is a dull one and little improvement is anticipated for several weeks. Some concern exists in the fertilizer trade in the sharp decline in the prices of most farm commodities. However, large crops are expected to offset declining prices in most instances, and the farmer is expected to be in the best position in years to buy heavily in the next fertilizer year. Conservative estimates place the possible gain as much as 10 to 15% over this year's highly satisfactory volume. There appears to be little foundation for the case of "nerves" that many buyers of raw materials are suffering from at the moment. Nevertheless a feeling that lower prices in many items may occur does prevail and seems to be largely caused by the weakness in cottonseed meal and the organics.

After several weeks of rumors of impending price advances in superphosphate official announcement was made in the final week of the month of a 50c a ton increase in the Baltimore and northern producing points. New price level is $8.50 for run of pile basis 16%, and $9 per ton for guaranteed 16% material, f. o. b. producing point in bulk.

The price structure of organic ammoniates was decidedly weaker last month, and the resale price of ground menhaden scrap has sagged to the level at which the season opened. Cottonseed meal is down to $21 per ton in the face of a bumper cotton crop. This weakness in cotton meal is partially blamed at least for the decline in organic ammoniates.

August 31st was the final day for buyers to take advantage of the long term contracts on ammonium sulfate, and according to producers, a large volume of business has been booked. To date little reselling has been apparent. An extremely quiet market in potashes is reported.

Important Price Changes

	Aug. 31	July 31
ADVANCED		
Superphosphate, run of pile	$8.50	$8.00
16% guar.	9.00	8.50
DECLINED		
Blood, Chicago	$ 3.15	$ 3.25
Imported	3.40	3.60
Bone: raw, imported	32.00	35.00
Fish scrap, Menhaden:		
dried	3.50	4.00
wet	3.00	3.10
Menhaden meal	56.00	58.00
Nitrogenous, imported	3.15	3.25
Tankage, unground	3.25	3.60
ground	3.40	3.60
Chicago	3.00	3.25
Imported	3.60	3.70

July Sales 58,226 Tons

July fertilizer tax tag sales in the 12 reporting southern states amounted to 58,226 tons. This was approximately one-third more than in July of last year and was substantially above July, '35. In the southern and midwestern areas the sales for the month of July are ordinarily a very small part of the year's total. In the past several years July tag sales in the South accounted, on the average, for only 0.6% of the year's total, while in the Midwest the July ratio has been 0.9%.

Sales in the South in the first 7 months of this year totaled 4,707,851 tons, compared with 3,689,052 tons last year. This represents a gain of 28% over the corresponding period of '36. Increases were reported by all 12 States. Only 6, however, had larger sales in July this year than in July, '36.

Midwestern sales in the January-July period of this year aggregated 301, 868 tons, 25% more than in the corresponding period of last year and 53% more than in the January-July period of '35. With the exception of a small decline in Kansas tonnage, increases were registered by each of the States. For the month of July alone, the amount of fertilizer sold in all 17 tag sale states was higher than it has been since 1931.

Heavy Superphosphate Production

Relatively high level of superphosphate production which has prevailed in recent months continued in June when the aggregate production of acidulators who report their statistics to The National Fertilizer Association was the largest for the month since 1930 and exceeded June of last year by 30%. Production in the fertilizer year ended June, '37, was by far the largest for the recovery period to date, exceeding output in '35-'36 by 40%. Increase in the Southern Area was larger than in the Northern Area.

Rise in shipments kept pace with the increased production, increases shown in all types of shipments by reporting acidulators in the year ended June 30th. As compared with the '35-'36 period, shipments to mixers rose 36%, to consumers 7%, and in base and mixed goods 18%.

Stocks increased somewhat during the month of June in accordance with the usual seasonal movement. On the whole, however, they have failed to show much increase during the past year in spite of the sharp rise in production. Stocks in bulk superphosphate at the close of June were 12% higher than a year ago; stocks in base and mixed goods were 21% higher.

To Develop Western Phosphate

Senator James P. Pope of Idaho announced last month plans for a survey by federal agencies and 4 western states to develop western phosphate deposits and "give the American farmers a chemical tonic that will revitalize their anaemic land."

Pope said a survey of the phosphate deposits in Idaho, Wyoming, Montana and Utah will be started Sept. 14th by a party of geologists from those states working with technical representatives of the TVA, the geological survey, and the agricultural and interior departments.

Survey party will make a full report at a conference tentatively set for Oct. 8 and 9th, which will be attended by the governors of the states, their congressional delegates and other state and federal officials.

Exports, Imports Expand

Exports of fertilizers and fertilizer materials in June totaled 134,737 short tons with a stated valuation of $1,670,813. This represented increases of 18% in tonnage and 85% in value over June of last year. In the fiscal year ended with June exports totaled 1,596,656 short tons, 20% under the '35-'36 year but somewhat larger than two years ago. Upward trend of potash exports which had been so pronounced in recent years was continued last year.

June imports amounted to 137,181 short tons valued at $2,757,212. As compared with June of last year there were increases of 61% in volume and 68% in value. Reflecting the upturn in domestic consumption of fertilizers, imports of materials in the '36-'37 fiscal year were 30% larger than in '35-'36. Substantial increases were recorded in imports of nitrogenous materials and also in potash salts. Potash imports were practically as large as two years ago. Downward trend in imports of manure salts continued last year but muriate, kainite, and sulfate of potash were imported in larger volume.

Imports of fertilizer materials also increased spectacularly in the first half—1,225,000 tons valued at $27,000,000 being brought in against 912,800 tons valued at $19,271,000 in the corresponding months of '36. In this classification receipts of Chilean nitrate increased from 394,400 to 538,500 tons in quantity and from $7,709,000 to $9,962,000 in value.

Imports of industrial chemicals, which include a wide line of raw and semi-manufactured materials increased from $9,466,000 to $15,210,000. In this group receipts of natural camphor increased from 2,163,175 to 3,130,600 lbs.; crude glycerine from 2,612,600 to 10,270,000 lbs., and refined from 82,000 to 5,556,500 lbs.

Receipts of waxes, used mainly in the manufacture of polishes, continued heavy in the first half of the year with the total value reaching $4,452,000, compared with $3,718,300 in the same months of '36. This group is made up largely of carnauba wax, receipts of which increased from 8,129,000 to 9,362,500 lbs.; vegetable wax, from 3,412,500 to 4,637,600; and beeswax from 2,480,000 to 3,122,000 lbs.

Other items on the chemical and related products import list recording increases in the first half of the current year, compared with the same months of 1936 included crude drugs, receipts of which increased in value from $3,267,700 to $3,919,000; vegetable tallow from $127,700 to $459,000; essential oils from $2,020,000 to $3,000,000; medicinal materials, including quinine sulfate and the like, from $2,464,000 to $2,593,500; cod liver oil, from $1,692,600 to $1,960,000; and soaps, toilet preparations and perfume materials, from $1,209,000 to $1,462,500.

Fertilizer's Executives in Europe

Charles J. Brand, secretary, National Fertilizer Association, has returned after an absence of several weeks in Europe. He addressed the International Chamber of Commerce Congress in Berlin, attended the National Congress of German Chemists at Frankfort-on-Main, the 5th International Technical and Chemical Congress of Agricultural Industries at Scheveningen, the Netherlands, and the 4th International Grassland Conference at Aberystwyth, Wales.

J. E. Totman, president of Summers Fertilizer, Baltimore, Md., sailed for London in the *City of Havre* on Aug. 5th. Mrs. Totman and their son, James, accompanied him. They will tour the Continent and return about Oct. 1st.

Several other members of the industry have taken their vacations in Europe this year. John J. Watson, president, I. A. C., is making his usual combination business and vacation trip. P. H. Manire, president, Marshall Cotton Oil, was away from May 12 to July 18th, and was a delegate at the Rotary Convention, Nice, France. T. H. Wright, president, Acme Guano, is in Venice, Italy.

Smith Dies at 68

Marshall A. Smith, 68, chairman of the board, Smith Agricultural Chemical, Columbus, Ohio, died at his home on Aug. 5th. He has been connected with Smith Agricultural in an executive capacity since 1894. Mr. Smith was a 32nd Degree Mason and was a member of a number of clubs as well as the Columbus Chamber of Commerce, the Navy League of America, Sons of the American Revolution, and the Society of Colonial Wars.

J. V. Champion, formerly with Eastern Fertilizer Corp., Norfolk, Va., is now connected with the Chilean Nitrate Sales. He will continue to make his home in Norfolk.

Potash Inquiry Extended

Senate committee on public lands on Aug. 4th, favorably reported a resolution to extend for one year the time when that committee shall report results of its investigation of the potash industry.

Study Soil Improvement

A special committee of officers of the N. F. A., consisting of W. T. Wright, president; Henry S. Parsons, vice-president; and Charles J. Brand, executive secretary and treasurer, is studying extension of the soil improvement work of the association.

Potash Sales Up

American Potash Institute announces that potash sold and invoiced within the continental U. S., Canada, Cuba, Puerto Rico, and Hawaii during the second quarter of the calendar year amounted to 47,279 tons of actual K_2O. This was equivalent to 93,131 tons of potash salts. Constituting this total were 70,851 tons of muriate, 4,240 tons of manure salts, 4,253 tons of sulfate, 12,975 tons of kainit, and 1,082 tons of sulfate of potash-magnesia. These figures include salts of domestic and foreign origin, exclusive of importations of potassium nitrate.

Sales during the first half amounted to 178,661 tons of actual K_2O. This was equivalent to 359,485 tons of potash salts. Constituting this total were 255,577 tons of muriate, 22,874 tons of manure salts, 25,055 tons of sulfate, 52,506 tons of kainit, and 3,473 tons of sulfate of potash-magnesia.

Above compares to deliveries of 113,024 tons of K_2O during the corresponding period in 1936, equivalent to 224,846 tons of salts, consisting of 149,801 tons of muriate, 27,695 tons of manure salts, 19,563 tons of sulfate, 2,316 tons of sulfate of potash-magnesia, and 25,471 tons of kainit.

Tappi to Meet in Savannah

With the colorful history of Savannah as a background, that city is making extensive arrangements to entertain delegates to the fall meeting of the Technical Association of the Pulp and Paper Industry when they visit Oct. 18, 19 and 20th. The De Soto Hotel will be convention headquarters and the hospitality of the entire city will be thrown open to the visitors. Anyone desiring general information about the convention should address D. G. Moon, chairman, Convention Committee, P. O. Box 703, Savannah.

Moore Resigns From J.-M.

Kenneth E. Moore, associated with the sales promotion department of Johns-Manville for the past 10 years, has resigned to become assistant advertising manager of Flintkote, East Rutherford, N. J.

Monsanto Reports Record Earnings

Victor Markets Stock—Harshaw Registers 59,458 Shares With S. E. C.—Brown Reorganization Plan Announced—Quarterly Earnings Statements Favorable—

Both sales and earnings of the Monsanto Chemical Co. and its subsidiaries for the 3 months ended June 30th, established new all-time peaks.

While chemical manufacturers are believed to have had a record quarter in the 3 months ended with June, part of Monsanto's improvement probably was the result of plant and property expansion carried out last year. The program is still on and has required financing.

Company sold in July as Series A 50,000 shares of the 275,000 of preferred stock authorized by the shareholders early this year. Offering price to the public was $101.50 a share and the net proceeds to the company, after all expenses, approximated $98.50 a share. Net sales for the 6 months were $17,302,646.

Monsanto and subsidiaries report for quarter ended June 30th, net profit of $1,441,405 after depreciation, federal income taxes, estimated surtax on undistributed earnings, subsidiary preferred dividends and minority interest, equivalent to $1.29 a share on 1,114,408 shares (par $10) of capital stock, comparing with $1,333,854, or $1.20 a share, in preceding quarter. In June quarter of 1936, net profit was $1,035,730 before any provision for surtax on undistributed profits, equal to 93c a share on 1,114,410 shares.

For 6 months ended June 30th, net profit was $2,775,259 after charges and taxes including undistributed profits, taxes, equal to $2.49 a share. In first half of '36, net profit was $2,068,583 before undistributed profits taxes, equal to $1.85 a share.

Net profit for the 12 months ended June 30th, last, was $5,175,380, equal to $4.64 a share. Provision for taxes for this period includes the surtax on the entire year '36.

Victor Expansion Plans

Acquisition of real estate and construction of a chemical plant near Mount Pleasant, Maury County, Tenn., will account for the use of $1,000,000 of the proceeds of the sale of 75,000 of the 696,000 shares of $5 par value stock of Victor Chemical Works, which were the subject of a registration statement announced Aug. 9th by the S. E. C.

Another $175,000 will be used for expansion of the company's manufacturing facilities at Chicago Heights and West Nashville. Balance will be used for working capital, according to the registration statement. Of the total offering of 150,000 shares, 75,000 are for account of the company and 75,000 are to be acquired from stockholders. Remaining 546,000 shares are outstanding. F. Eberstadt & Co. of N. Y. is the underwriter.

Harshaw To Issue Rights

A statement registering 59,458 common shares without par value of Harshaw Chemical, Cleveland, has been filed with the S. E. C. Registration statement also covers 118,915 subscription rights entitling present stockholders to purchase the registered shares at the rate of one additional share for each two shares owned. The unsubscribed portion of the shares registered will subsequently be offered publicly by an underwriting group under the management of Mitchell, Herrick & Co. and including Field, Richards & Shepard, Inc., Otis & Co., Hayden, Miller & Co., Hawley, Huller & Co., the First Cleveland Corp. and Granbery, Marache & Lord.

Net proceeds to the company will be used to retire bank loans of approximately $650,000, to make plant and laboratory additions and improvements requiring about $500,000, to acquire inventories, and for other corporate purposes.

Brown Co. Reorganization Plan

A plan for reorganization of the Brown Co. has been filed by Orton B. Brown, vice-president and treasurer, with the Federal District Court at Portland, Me.

Plan contemplates no reduction in principal and no impairment of lien position for bondholders, and provides for payment in cash of all past due interest, together with interest on interest. Preferred stockholders would retain their present equity, and would receive a larger stock interest and voting privileges to compensate for dividend arrears.

Because estimates indicate a 1938 demand for the company's pulp at least 50% in excess of possible output of present plants, new financing of $12,500,000 is proposed for working capital and to expand production facilities.

Dividends and Dates

Name	Div.	Stock Record	Payable
Am. Agr. Chem.	$4.00	Sept. 10	Sept. 30
Am. I. G., Cl. A	$3.00	Sept. 10	Sept. 15
Am. I. G., Cl. B	30c	Sept. 10	Sept. 15
Am. Maize Prods.	No action June 11th		
Archer-Daniels-Midland	50c	Aug. 21	Sept. 1
Armour, $6 pr. pf.	$1.50	Sept. 10	Oct. 1
Armour, 7% pf.	$1.75	Sept. 10	Oct. 1
Armour & Co., pf.	$1.75	Sept. 10	Oct. 1
Atlantic Ref.	25c	Aug. 20	Sept. 15
Atlas Powder	$1.00	Aug. 31	Sept. 10
Calif. Ink	62½c	Sept. 10	Sept. 20
Can. Ind., Cl. A	$1.75	Sept. 30	Oct. 30
Can. Ind., Cl. B	$1.75	Sept. 30	Oct. 30
Can. Ind., Ltd., 7% pf.	$1.75	Sept. 30	Oct. 15
Carman & Co., Cl. A, ac.	$1.50	Aug. 14	Sept. 1
Celluloid part., pf.	$2.00	Aug. 16	Aug. 30
Colgate-Palmolive-Peet	12½c	Aug. 6	Sept. 1
Colgate-Palmolive-Peet, pf.	$1.50	Sept. 4	Oct. 1
Columbian Carbon, sp.	75c	Aug. 18	Sept. 10
Columbian Carbon	$1.00	Aug. 18	Sept. 10
Comp. Ind. Gases	50c	Sept. 4	Sept. 15
Cook Paint & Varnish, ext.	10c	Aug. 20	Sept. 1
Cook Paint & Varnish	15c	Aug. 20	Sept. 1
du Pont (deb.)	$1.50	Oct. 8	Oct. 25
du Pont	$1.50	Aug. 25	Sept. 15
a du Pont ($4.50 pf.)	$1.35	Oct. 8	Oct. 25
Eastman Kodak	$2.00	Sept. 4	Oct. 1
Eastman Kodak, pf.	$1.50	Sept. 4	Oct. 1
Eagle Picher Lead	10c	Sept. 15	Oct. 1
Eagle Picher Lead, pf.	$1.50	Sept. 15	Oct. 1
Fansteel Met., $5 pf.	$1.25	Dec. 15	Dec. 17
Fansteel Met., $5 pf.	$1.25	Sept. 15	Sept. 30
Freeport Sulphur	50c	Aug. 13	Sept. 1
Freeport Sulphur, pf.	$1.50	Oct. 15	Nov. 1
Int. Nickel	50c	Aug. 31	Sept. 30
McKesson & Robbins, $3 pf.	75c	Sept. 1	Sept. 15
Mead Corp.	50c	Sept. 1	Sept. 20
Mead Corp., $6 pf., A	$1.50	Aug. 14	Sept. 1
Mead Corp, $5.50 pf., B	$1.37½	Aug. 14	Sept. 1
Merck	25c	Sept. 15	Oct. 1
Merck, pf.	$1.50	Sept. 15	Oct. 1
Monsanto Chem.	50c	Aug. 25	Sept. 15
* Monsanto Chem., $4.50 pf.	$1.64	Nov. 10	Dec. 1
Nat. Lead	12½c	Sept. 10	Sept. 30
Nat. Lead, pf. A	$1.75	Aug. 27	Sept. 15
Nat. Lead, pf. B	$1.50	Oct. 14	Nov. 1
N. J. Zinc	50c	Aug. 20	Sept. 10
Oils & Industries	25c	Aug. 20	Sept. 1
Oils & Industries, pt. pf.	37½c	Aug. 20	Sept. 1
Patterson-Sargent, ext.	50c	Aug. 20	Sept. 1
Patterson-Sargent	25c	Aug. 20	Sept. 1
Penick & Ford	25c	Sept. 1	Sept. 15
Penn. Salt Mfg.	$2.00	Aug. 3	Sept. 15
Penn. Salt Mfg.	$2.00	Aug. 31	Sept. 15
Procter & Gamble, 5% pf.	$1.25	Aug. 25	Sept. 15
St. Josephs Lead	50c	Sept. 1	Sept. 20
Sherwin & Williams, pf.	$1.25	Aug. 14	Sept. 1
Spencer Kellogg	40c	Sept. 15	Sept. 30
Swift & Co.	30c	Sept. 15	Oct. 1
Texas Gulf Sulphur	50c	Sept. 1	Sept. 15
United Dyewood, pf.	$1.75	Sept. 10	Oct. 1
United Dyewood, pf.	$1.75	Dec. 10	Jan. 3

* Represents proportions of the semi-annual dividend for the unexpired period ending Dec. 1.
a Covers period from July 7 to Oct. 25.

Price Trend of Chemical Company Stocks

	July 31	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Aug. 31	Net Gain or loss last month	Price on Aug. 31, 1937	1937 High	1937 Low
Air Reduction	71½	71¼	72¾	69	67¼	68¼	— 3¼	73⅞	80¼	64½
Allied Chemical	239¼*	235	239¾	235	225	232	— 7¼	226	258½	215
Columbian Carbon	121⅞*a*	122⅛	123¼	118¼	...	117½*b*	— 4⅞	122†	125¾	111
Commercial Solvents	14⅛	14	14¼	13⅜	13¼	13¼*b*	— ⅞	16⅞	21¼	13
du Pont	159¾	161	163½	160⅝	154	155	— 4¾	157	180⅛	148½
Hercules Powder	161*	...	160½	160½	161	161*b*	...	113¾	185	144⅞
Mathieson Alkali	37*	37	37¼	36⅜	35⅞	35⅞*b*	— 1⅛	35¾	41¾	32⅝
Monsanto Chemical	102*	103	104	104¼	107¼	104½	+ 2½	100⅛	107½	85
Std. of N. J.	70	68½	69	66½	63¾	65⅛	— 4⅞	62⅞	76	63½
Texas Gulf Sulphur	38½*	38⅝	39⅛	38⅜	38	37¾	— ¾	38⅛	44	33¾
Union Carbide	101¾	100½	104	99⅞	96	98	— 3¾	95¼	111	95
U. S. Ind. Alcohol	32	33¼	34¾	35¾	32⅜	33	+ 1	34¼	43⅝	28

* July 30th; *a* July 27; *b* Aug. 26; † Aug. 27, 1936.

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American I. G.'s Interim

Directors of American I. G. Chemical have declared an interim dividend of $3 a share to holders of the company's common A stock and a disbursement of 30c a share on the common B shares. Both dividends are payable on Sept. 15th to stock of record of Sept. 10th. On Dec. 29, 1936, annual distribution of $2 and an extra 50c on the common A stock were paid, while the common B shareholders received 5c extra and 20c annual.

Hercules Declares $1.50 Dividend

Hercules Powder's board of directors has declared a quarterly dividend of $1.50 a share on company's outstanding common shares. This dividend is payable on Sept. 25th, to stockholders of record, Sept. 14th. As previously announced by the company, it is also expected that stockholders of record on Sept. 14th will be offered rights to subscribe, at $75 a share, to additional shares of the company's common stock in the ratio of one such share for each 10 shares then held. These rights will be exercisable on or before Oct. 14th. Shares subscribed for under this offer will not participate in the Sept. 25th dividend.

Climax For the Big Board?

Climax Molybdenum which dominates the world supply of molybdenum, is experiencing an increase in demand this year due to heavier steel production both here and abroad which may increase 1937 output as much as 50% over the approximately 15,000,000 lbs. produced in 1936.

It is understood that it is planned to apply for listing on the N. Y. Stock Exchange of Climax capital stock, of which 2,520,000 shares are outstanding, in the near future. Climax reported net income for 1936 of $5,206,111, equal to $2.06 a share compared with $3,277,767 or $1.28 a share in 1935. Net income this year on a per share basis probably will follow approximately the increase in production, indicating roughly $3 a share for the stock.

86c A Share For Tennessee

Tennessee Corp. for 6 months ended June 30th, estimates the consolidated net income at $733,718 after interest, depreciation, income taxes, minority interest and after provision of $75,000 for flood losses (the exact amount not yet determinable) but before surtax on undistributed profits, equal to 86c a share on 853,696 shares of stock, excluding 4,200 shares held by company.

Columbian Carbon Net Higher

The report of Columbian Carbon and subsidiaries for the first half shows a net income, after Federal income taxes, depreciation, minority interest charges and other expenses, of $2,520,686, equal to $4.69 each on the 537,406 shares of capital stock outstanding at the end of the period. No provision was made for surtax on undistributed profits. Net income compares with one of $1,843,305, or $3.43 a share, in the first 6 months of '36.

For the second quarter company had a net income, based on a comparison of company's reports for the first quarter and first half of the year, of $1,072,150, equal to $1.99 a capital share, against $1,448,536, or $2.69 a share in the preceding quarter, and $816,294, or $1.52 a share, in the June quarter of last year.

American Potash—$1,213,789

American Potash and Chemical and subsidiaries for 6 months ended June 30th, show estimated net profit of $1,213,789, equivalent to $2.29 a share on 528,390 capital shares, compared with a net profit of $828,833, or $1.75 a share on the stock, in the first 6 months of last year.

National Oil Products—$326,041

Report of National Oil Products Co. for 6 months ended June 30th, shows net profit of $326,041 after charges, depreciation and normal federal income taxes, but before surtax on undistributed profits, equal to $1.93 a share on 169,128 shares of capital stock. This compares with $239,072 or $1.41 a share in first 6 months of '36.

Vanadium Profits Soar

Report of Vanadium Corp. of America and subsidiaries for 6 months ended June 30th, shows net profit of $612,400 after federal income taxes, depreciation, interest, etc., but before surtax on undistributed profits, equal to $1.62 a share on 376,637 no-par shares of capital stock. This compares with $41,838 or 11c a share in first half of '36.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1937	Net income 1936	Common share earnings 1937	Common share earnings 1936	Surplus after dividends 1937	Surplus after dividends 1936
Abbott Laboratories:							
Six months, June 30	§$1.60	$865,335	$677,570	*h*$1.35	*h*$1.13	.....	.....
Twelve months, June 30	$1.60	1,603,041	1,286,827	*h*2.50	*h*2.14	.....	.....
Air Reduction:							
June 30 quarter	§1.00	2,289,498	1,950,938	.90	.75	*.....	*.....
Six months, June 30	§1.00	4,240,437	3,332,476	1.67	1.31	*.....	*.....
American Agricultural Chemical:							
Year, June 30	*y*9.00	1,868,944	1,005,813	*h*8.86	*h*4.71	$814,290	$344,289
American Maize-Products:							
Six months, June 30	*y*1.75	†229,385	369,528	....	1.23	.....	.....
American Potash & Chemical:							
Six months, June 30	*w*1.50	1,213,788	828,832	2.29	1.57	.....	.....
Certain-Teed Products:							
June 30 quarter	*f*....	163,056	71,211	.01	*p*1.13	.....	.....
Six months, June 30	*f*....	170,072	†205,756	*p*2.33	....	.....	.....
Colgate-Palmolive-Peet:							
Six months, June 30	.50	1,715,696	370,198	.50	*p*1.50	487,413	*d*858,497
Columbian Carbon:							
June 30 quarter	§4.00	1,072,150	816,294	1.99	1.52	.....	.....
Six months, June 30	§4.00	2,520,686	1,843,305	4.69	3.43	.....	.....
Commercial Solvents:							
June 30 quarter	.60	360,606	466,170	.14	.18	.....	.....
Six months, June 30	.60	862,380	1,083,948	.33	.41	.....	.....
Continental-Diamond Fibre:							
June 30 quarter	*w*.50	142,437	184,253	.31	.40	*.....	*.....
Six months, June 30	*w*.50	323,625	229,972	.71	.50	*.....	*.....
Davison Chemical:							
Year, June 30	*w*.60	578,943	.....	1.13	....	.....	.....
du Pont:							
June 30 quarter	*w*2.00	23,822,888	23,978,189	*j*2.07	*j*2.06	110,259	4,655,740
Six months, June 30	*w*2.00	39,836,234	38,691,971	*j*3.41	*j*3.27	6,190,270	7,775,563
Eagle Picher Lead:							
Six months, June 30	*w*.10	745,954	338,520	.81	.36	.....	.....
Eastman Kodak:							
24 weeks, June 12	8.00	11,475,066	8,081,870	5.01	3.51	.....	.....
Evans-Wallower Lead:							
Six months, June 30	*f*....	†17,857	.....	....	....	.....	.....
Interchemical Corp.:							
June 30 quarter	2.00	361,397	342,910	*h*.91	*h*.88	.....	.....
Six months, June 30	2.00	766,483	585,711	*h*1.96	*h*1.41	277,025	145,009
Twelve months, June 30	2.00	1,479,886	1,176,862	*h*3.73	*h*2.84	.....	.....
International Nickel:							
June 30 quarter	*w*.50	14,199,395	9,070,187	.94	.59	6,426,836	213,262
Six months, June 30	*w*.50	25,914,352	17,456,974	1.71	1.13	10,369,234	472,032
Lindsay Light & Chemical:							
Six months, June 30	*w*.10	19,961	18,326	.20	.17	.....	.....
Monsanto Chemical:							
June 30 quarter	§2.00	1,441,405	1,035,730	1.29	.93	.....	.....
Six months, June 30	§2.00	2,775,259	2,068,583	2.49	1.85	.....	.....
Twelve months, June 30	§2.00	5,175,380	*	4.64	....	.....	.....
National Oil Products:							
Six months, June 30	*w*.50	326,041	239,072	1.93	1.41	.....	.....
New Jersey Zinc:							
June 30 quarter	§2.00	2,181,941	1,265,593	1.11	.64	218,677	283,961
Six months, June 30	§2.00	4,351,782	2,339,772	2.21	1.19	425,254	d605,124
St. Joseph Lead:							
Six months, June 30	*w*.50	4,507,360	647,175	2.30	.33	1,573,842	60,473
Sun Oil Co.:							
Six months, June 30	§1.00	4,376,371	3,474,811	1.90	1.57	3,004,248	2,165,176
United Carbon:							
June 30 quarter	4.00	643,000	519,776	1.62	1.31	.....	.....
Six months, June 30	4.00	1,365,368	1,087,607	3.43	2.73	.....	.....
Vanadium:							
Six months, June 30	*f*....	612,400	41,838	1.62	.11	.....	.....
Virginia Carolina Chemical:							
Year, June 30	*f*....	1,254,040	93,754	*p*5.87	*p*.44	.....	.....
Vulcan Detinning:							
June 30 quarter	*w*3.00	121,930	66,497	2.95	1.23	.....	.....
Six months, June 30	*w*3.00	232,398	127,491	5.55	2.30	.....	.....

* Not available; † Net loss; § Plus extras; *d* Deficit; *f* No common dividend; *h* On shares outstanding at close of respective periods; *j* On average shares; *p* On preferred stock; *w* Last dividend declared; *y* Amount declared in last 12 months.

ABC

CRESYLIC ACID

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Diethyl Phthalate
Dimethyl Phthalate
Triacetin

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Chemical Stocks and Bonds

Aug. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales (Number of shares Aug. 1937)	Sales (1937)	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1936	Earnings** $-per share-$ 1935
NEW YORK STOCK EXCHANGE														
68¼	80¼	64½	86½	58	57½	35	16,600	171,700	Air Reduction	No	2,523,065	$2.50	2.79	2.10
232	258½	215	245	157	173	125	6,800	90,700	Allied Chem. & Dye	No	2,214,099	6.00	11.44	8.71
94	101½	83	89	49	57¾	41½	3,900	50,500	Amer. Agric. Chem.	No	210,934	2.50	4.71	6.37
22⅞	30¾	20½	35⅜	20½	35¾	22½	6,000	140,300	Amer. Com. Alcohol	20	260,947	.50	4.55	3.16
41¾	46	39⅝	50	37	52	36	3,000	39,000	Archer-Dan-Midland	No	549,546	3.00	3.20	3.46
73½	94	68½	84	48	48½	32¾	2,200	31,400	Atlas Powder Co.	No	248,660	3.50	4.21	2.81
120¼	133	113¾	131	112	115	106¾	50	3,520	5% conv. cum. pfd.	100	88,781	5.00	20.86	16.93
36	41¼	26⅝	32¼	21¾	35⅜	19½	51,100	1,325,100	Celanese Corp. Amer.	No	1,000,000	1.50	2.25	1.99
108½	115	106½	116	106	111¼	97½	1,000	11,600	prior pfd.	100	164,818	7.00	27.25	35.34
17¾	25¾	17⅜	21¼	13	21	15⅛	40,700	584,200	Colgate-Palm.-Peet	No	1,956,086	.75	1.40	1.36
103¼	104½	102	106½	100	107¼	101	1,600	12,600	6% pfd.	100	246,496	6.00	17.12	16.79
117½	125¾	111	136½	94	101¼	67	2,600	33,300	Columbian Carbon	No	537,586	5.75	7.48	5.56
13¼	21¼	13	24⅝	14¼	23⅞	16½	36,800	620,100	Commercial Solvents	No	2,635,371	.80	.84	1.02
65	71¼	54⅞	82½	63⅝	78⅜	60	18,500	194,900	Corn Products	25	2,530,000	3.75	3.86	2.62
160½	171½	153	170	158	165	148¼	800	7,700	7% cum. pfd.	100	243,739	7.00	46.76	33.97
59	76⅛	59	63	42	50⅜	35½	1,400	15,300	Devoe & Rayn. A	No	95,000	2.00	4.49	2.89
117½	159¼	115¾	142¼	94⅛	105½	80½	4,200	27,400	Dow Chemical	No	945,000	2.40	4.48	3.43
155	180⅛	148½	184¼	133	146½	86⅝	28,600	275,100	DuPont de Nemours	20	11,049,470	6.10	7.56	5.04
134¼	135½	130¼	136½	129	132	126⅞	2,200	15,900	6% cum. deb.	100	1,092,699	6.00	84.21	56.81
186	198	151	185	156	172¼	110½	11,000	85,000	Eastman Kodak	No	2,250,921	6.75	8.24	6.90
161	163	150	166	152	164	141	420	2,980	6% cum. pfd.	100	61,657	6.00	306.64	258.09
28¾	32¼	24¼	35⅝	23½	30⅝	17¼	17,600	222,300	Freeport Texas	10	796,380	1.00	2.43	1.78
110	117	105½	135	108	125	112½	110	1,060	6% conv. pfd.	100	12,031	6.00	163.38	121.30
42	51½	40¾	55¼	39½	49½	23¾	9,200	179,600	Glidden Co.	No	603,304	2.00	3.29	2.91
50⅞	58⅛	50⅞	56	52¼			1,000	16,900	4½% cum. pfd.	50	200,000	2.25	15.43	.....
116	117½	100	133	99⅝	119½	85	600	19,900	Hazel Atlas	25	434,409	7.64	6.56	7.58
162	185	144⅞	5⅞	2⅞	90	71	2,000	19,600	Hercules Powder	No	583,672	5.44	6.33	4.23
129½	135½	125	47¼	22¾	131	122	120	1,860	6% cum. pfd.	100	105,765	6.00	48.97	36.30
37	47½	33	66⅜	43¼	36⅜	23½	8,800	323,600	Industrial Rayon	No	606,500	2.10	2.24	1.00
50	64¼	41	48¾	37	42¾	21½	2,000	6,600	Interchem.	No	288,358	2.75	3.02	2.74
108	111½	104	112	107	110	98½	210	1,950	6% pfd.	100	66,917	6.00	18.97	17.19
5⅜	9⅛	5	30	23	5	2⅝	17,700	592,500	Intern. Agricul.	No	436,049	None	—1.55	—.99
45½	63½	42	36¾	29¼	42¾	26	1,700	105,100	7% cum. pr. pfd.	100	100,000	None	.23	2.69
61¾	73⅜	55⅛	80¼	47⅛	47¼	22¼	106,800	1,407,500	Intern. Nickel	No	14,584,025	1.30	2.40	1.65
25½	28¾	24	46½	32½	36¼	25	500	11,900	Intern. Salt	No	240,000	2.00	1.65	1.32
28	36	26½	42⅜	27½	36¼	31	1,700	15,400	Kellogg (Spencer)	No	500,000	1.60	2.62	2.22
66⅝	79	58½	103	79	49¼	21½	13,800	211,500	Libbey Owens Ford	No	2,503,168	3.50	4.15	3.26
24¾	26⅞	21⅝	36½	26⅜	37¼	24½	16,000	101,600	Liquid Carbonic	No	684,812	.80	1.58	1.29
35⅞	41¾	32⅝	171	155	33⅞	23¾	4,000	87,100	Mathieson Alkali	No	830,428	1.50	1.76	1.44
104½	107½	85	147	137¾	94¾	55	7,800	84,300	Monsanto Chem.	10	1,114,409	3.00	4.01	3.84
35¼	44	30⅜	40	9	20⅝	14½	23,400	358,900	National Lead	10	3,095,100	.875	1.71	1.08
156⅛	171	154¾	164	125	162½	150	300	5,000	7% cum. "A" pfd.	100	213,793	7.00	33.83	25.40
133	150	127	56	40¼	140½	121¾	500	1,510	6% cum. "B" pfd.	100	77,462	6.00	74.50	49.05
32¼	41¾	28	122½	115¾	10⅜	4⅜	31,500	667,200	Newport Industries	1	519,347	.60	.98	.57
99½	103¾	82½	13	5¾	129	80	18,500	95,100	Owens-Illinois Glass	25	1,330,602	6.00	7.53	6.52
58½	65½	55½	146	84	53¾	42¾	12,700	99,800	Procter & Gamble	No	6,410,000	1.87	2.39	2.32
117	118½	114½	135	126	121	115	450	3,240	5% pfd. (ser. 2-1-29)	100	171,569	5.00	94.14	88.15
13¼	15⅜	10¾	41⅜	25⅝	8¾	4	25,000	368,900	Tenn. Corp.	5	853,696	.15	.47	.22
37¾	44	33¾	44¾	33	36¾	28¾	16,000	674,000	Texas Gulf Sulphur	No	2,540,000	2.50	.....	1.94
98	111	95	105¼	71⅜	75¾	44	47,100	361,000	Union Carbide & Carbon	No	8,903,138	2.30	4.09	3.06
85½	91	69¾	96¾	68	78	46	2,900	60,700	United Carbon	No	397,877	4.05	5.54	4.71
33	43⅝	28	59	31⅛	50⅜	35⅛	12,700	70,500	U. S. Indus. Alco.	No	391,033	1.00	—.20	2.16
30¾	39⅜	24⅞	30½	16¼	21¾	11¼	35,100	691,600	Vanadium Corp.-Amer.	No	366,637	None	.40	—1.13
7⅞	12¾	7	8½	4⅜	4⅜	2½	21,500	671,900	Virginia-Caro. Chem.	No	486,000	None	—2.56	—.79
53	74⅜	48½	58¾	28¼	35¾	17½	6,400	231,500	6% cum. part. pfd.	100	213,392	None	.16	4.20
19¾	27¼	19	32	19¾	25½	16¼	1,700	41,200	Westvaco Chlorine	No	284,962	.75	1.39	1.63
29⅝	34⅞	29½	35¼	31¾			2,300	28,800	Westvaco Chlorine, cum. pfd.	30	192,000	1.50	3.26	.....
NEW YORK CURB EXCHANGE														
35⅜	37	26⅝	40¾	29¼	30	15	55,000	447,500	Amer. Cyanamid "B"	No	2,404,194	1.00	1.77	1.61
1⅞	2⅞	1⅝	3¾	2⅛	4	2	900	15,000	British Celanese Am. R.	10	2,806,000	None	—4.53	—.71
118	124	108½	116¾	99¾	115	90	450	12,550	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	24.47	21.96
8½	15	7¾	16½	9	15	7	200	12,400	Celluloid Corp.	15	194,952	None	—.80	—.95
13⅝	14⅝	12½	15	11⅞	14½	11⅜	100	3,750	Courtaulds' Ltd.	1 £	24,000,000	7½%	8.40%	7.51%
9⅛	10⅝	6¾	10¾	5	12½	6¼	2,300	55,500	Duval Texas Sulphur	No	500,000	.50	.61	.16
46½	47½	39½	55	39	58	37	500	11,400	Heyden Chem. Corp.	10	149,997	2.25	3.56	3.22
123	147½	114½	140	98¼	97¼	46¾	6,200	50,200	Pittsburgh Plate Glass	25	2,142,443	6.00	7.15	5.32
125	154¾	118	154½	117	128⅞	84	2,200	39,250	Sherwin Williams	25	635,583	4.00	8.04	6.19
108¾	114	107½	116	110	113½	106	300	2,350	5% pfd. cum.	100	155,521	5.00	41.44	33.17
PHILADELPHIA STOCK EXCHANGE														
169	179	162	179	114¼	116¾	76½	405	5,900	Pennsylvania Salt	50	150,000	8.50	10.59	7.74

Aug. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales (Aug. 1937)	Sales (1937)	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
107	109½	105½	117½	107¾	116	104½	263,000	3,162,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
36½	42½	31	42½	27½	29¾	7⅜	103,000	1,757,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5		12,433,000
101	102	100	102¾	96¾	100¼	91⅜	38,000	236,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
34⅞	35⅜	30¼	39	21	21½	7	283,000	2,602,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
28¾	28¾	20¾	35	23½	38	32⅛	1,000	25,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
103¼	105	103	105	103	104	91½	12,000	228,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
103	111	98¼	98½	85¾	94¼	66	119,000	1,458,000	Vanadium Corp. conv. 5's	1941	5	A. A.	4,261,000

* Paid in 1936, including extras; ** For either fiscal or calendar years.

Industrial Trends

August Business Activity Declines Only Slightly—Retail Trade Spotty—Commodity Prices Drop—Bright Outlook For Fall Business —Steel Activity at 84%—

Business activity held up remarkably well in August, despite heat waves, declining commodity prices, and serious developments in the Far East, which promise widespread repercussions in official and trade circles.

The chemical and closely related fields have already experienced certain of these repercussions. Chinawood oil has soared, carrying with it most of the competing oils. Tungsten ore is practically unattainable. Importers and exporters to the Far East are finding it very difficult to negotiate business and to obtain shipping facilities. Aside from products directly affected by the flare-up in China, the price structure in August was one of general firmness, with relatively few important price changes. The lead pigments were advanced, however, with the further strengthening of prices for the metal, cream of tartar was advanced 1c when argols were raised, and indications point to likely increases in the balance of the tartars. Lower prices for cottonseed meal have unsettled still further the price structure of the organic ammoniates.

Retail trade with large cities slumped somewhat, but this was largely attributed to the fact that the greatest travel and vacation period since '29 has occurred. Retail stocks in certain lines are heavier than they were at the corresponding period last year, but merchants anticipate a substantial increase in retail sales in September with vacationists returning and the greatly improved purchasing power of the farmer available.

In the heavy industries steel production holds up splendidly, although the low point of the year is supposed to be reached shortly. Current bookings are reported 15% ahead of last year. The automobile companies have curtailed production sharply and are preparing for '38 models. Rayon production continues at record levels, but uncertainties are present in cotton-goods production, silk, and wool.

The paper industry is exceptionally busy and for the 3rd consecutive month, July set a new high peak for newsprint production, tanners are anticipating a good fall demand from the shoe manufacturers, the glass industry has pulled out of the July doldrums, and an excellent fall paint season appears likely.

A new high in recovery was made in the week of August 14th by the *N. Y. Times* Index of Business Activity. Electrical consumption continues to smash all-time records and carloadings have been running approximately 5 to 7% ahead of the corresponding weeks of '36.

Commodity prices slumped rather sensationally at times last month. The losses were largely in the grains and cotton and were caused by reports indicating bumper crops.

Optimism is widespread over the fall outlook. Bank lending officials are especially so because of heavy inquiries for credit lines for the fall. Some go so far as to suggest the possibility of a buying movement almost rivalling that of the early spring. Yet the stock market lost ground in August, a period when it is usually discounting fall improvement.

Adjournment of Congress, the more conservative temper displayed by that body in the closing weeks, and the failure to enact the bill for the regulation of wages and hours were heartening to the business man. The improved employer-labor relationship and the discrediting of irresponsible and radical labor leaders are other encouraging factors.

Consensus of opinion seems to be on the side of moderate improvement in the fall, but there is little evidence of the boom psychology prevalent at this time a year ago. Industrial purchasing is expected to be conducted along conservative lines. Consumer buying will be greatly improved in the agricultural regions. Bountiful crops are more than off-setting the price declines.

Statistics of Business

	July 1937	July 1936	June 1937	June 1936	May 1937	May 1936
General:						
Acceptances, outst'd'g *c*	$351	$315	$364	$316	$385	.....
Coal Prod., anthracite, tons	2,697,000	3,925,000	4,475,000	3,515,878	3,790,521	.....
Coal Prod., bituminous, tons	31,610,000	32,005,000	31,726,000	33,523,000	34,217,000	.....
Com. Paper, outst'd'g *c*	$324	$187	$284	$168	$286	$184
Failures, Dun & Bradstreet	618	639	670	773	834	832
Factory Payrolls, totals†	101.2	80.2	102.8	81.1	105.2	80.8
Factory Employment†	103.3	92.8	101.2	90.1	102.3	89.8
Merchandise Imports‡	.....	.....	$285,946	$285,038	$191,697	$287,252
Merchandise Exports‡	.....	.....	$265,363	$288,924	$200,772	$269,171
Manufacturing:						
Automotive Production	438,834	440,731	497,298	452,968	516,899	460,512
Boot & Shoe Production	34,623,669	35,678,092	34,240,868	29,370,504	34,990,219	30,264,351
Bldg. Contracts, Dodge*‡	$321,602	$294,735	$317,842	$232,665	$244,112	$216,070
Gasoline Prod., bbls.‡	.....	.....	47,273	41,540	48,364	43,828
Hosiery, doz. pairs	.....	.....	.....	.....	9,758,687	9,379,143
Newsprint Production:						
Canada, tons	314,529	274,627	310,871	270,051	302,232	267,067
U. S., tons	78,205	73,361	78,500	79,830	79,003	75,719
Plate Glass Prod., sq. ft.	.....	.....	19,392,254	16,243,665	19,437,246	19,192,114
Steel Ingots Prod., tons	4,456,596	3,922,731	4,183,762	3,975,569	5,153,559	4,046,253
% Steel Activity	78.49	67.61	74.46	69.83	88.82	70.91
Pig Iron Prod., tons	3,498,858	2,594,268	3,107,506	2,586,240	3,537,231	2,648,401
U. S. Consumption, crude rubber, tons	.....	.....	51,798	52,722	51,733	50,612
Tire Shipments	.....	.....	5,389,274	5,793,014	5,374,654	5,833,333
Tire Production	.....	.....	5,339,238	5,612,284	5,351,638	4,974,119
Tire Inventory	.....	.....	12,528,789	7,835,488	12,592,215	8,177,800
Cotton Consumption, bales	583,066	607,056	681,394	555,449	669,460	530,894
Cotton spindles operating	24,391,782	23,251,764	24,555,716	23,021,042	24,159,296	.....
Rayon Prod., Ray. Org.	505	614	518	498	.....	.....
Silk Deliveries, bales	31,399	.....	35,783	.....	35,278	.....
Chemical:						
Chemical Employment†*a*	139.5	122.5	138.5	118.6	137.5	117.2
Chemical Payrolls†*a*	152.5	114.9	153.5	113.3	151.9	111.3
Chemical Exports‡	.....	.....	$12,560	$9,087	$13,235	$10,512
Chemical Imports‡	.....	.....	$8,087	$5,814	$9,152	$6,581

Week Ending	Carloadings 1937	Carloadings 1936	Carloadings % of Change	Electrical Output§ 1937	Electrical Output§ 1936	Electrical Output§ % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
July 31	782,660	747,529	+ 4.7	2,256,335	2,008,284	+ 8.0	91.5	95.6	76.7	72.4	78.6	88.3	83.6	85.5	107.8	108.3
Aug. 7	769,706	728,371	+ 5.7	2,261,725	2,079,137	+ 8.8	90.8	95.6	75.9	72.3	78.6	88.2	82.4	84.6	108.2	108.9
Aug. 14	777,382	736,578	+ 5.5	2,300,547	2,079,149	+10.6	90.0	95.6	73.4	72.3	78.6	87.5	82.0	83.2	111.2	108.9
Aug. 21	781,247	735,476	+ 6.2	2,304,032	2,093,928	+10.0	88.4	95.6	72.0	72.3	79.9	87.2	81.7	83.8	109.9	108.8
Aug. 28	.....	.....	.....	2,294,713	2,150,502	+ 8.0	88.1	95.6	69.9	72.9	79.9	86.7	...	...	....	....

c 000,000 omitted, as end of month; * 37 states; † Dept. of Labor 3-year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products, but not petroleum refining; ‡‡ 1926-1928 = 100.0; *x* Dept. of Commerce; *y* Preliminary; *z* Revised.

Air Reduction Takes Over

Air Reduction has acquired two subsidiaries of the Coca-Cola Co., both of which make and sell liquid carbon dioxide, it was revealed Aug. 30th when the committee on stock list of the N. Y. Stock Exchange approved an application of Air Reduction to list 36,790 additional shares of common stock.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1937 $1.11 - August 1937 $1.09

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.32	.43	.32	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys lb.	.20	.24	.20	.24	.21	.25
drs, f.o.b. wks, frt allowed lb.	.14	.15	.14	.15	...	.15
Acetin, tech, drs lb.	...	.33	.22	.33	.22	.24
Acetone, tks, f.o.b. wks, frt allowed lb.	...	.05	.05	.06½	.06	.11
drs, c-l, f.o.b. wks, frt allowed lb.	...	.06	.06	.07½	.07	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.09¾	.10	.06¾	.10	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.53	2.25	2.53	...	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.70	8.00	8.70	...	8.43
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.75	10.50	12.43	...	12.43
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	.85	.95	.85	.95	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, delv 100 lbs.	1.45	2.60	1.35	2.60	1.35	2.50
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	95.00	...	95.00	...	95.00
Broenner's, bbls lb.	...	1.11	...	1.11	1.11	1.25
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.14¾	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.25	.26	.25	.26	.25	.29
anhyd, gran, bbls lb. *b*	...	.27½	.27½	.29	.29	.31
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.89	.91	.72	.91	.51	.74
99%, straw, LB, drs, wks, frt equal gal.	.92	.94	.77	.94	.68	.79
resin grade, drs, wks, frt equal lb.	.10¾	.11¼	.09	.11¼	.52*y*	.65*y*
Crotonic, drs lb.	.75	1.00	.75	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.65	.68	.65	.68	.65	.68
USP, bbls lb.	.77	.80	.77	.80	.70	.80
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	.80	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 34% com 155 lb cbys, wks lb.	.42	.44	.40	.42	...	...
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.11	.12
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.05
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.07
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.12
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.10
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.14½
USP X, 85%, cbys lb.	.42	.45	.42	.50	.45	.50
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.47
Linoleic, bbls lb.	...	.20	.16	.20	.16	.16
Maleic, powd, kgs lb.	.30	.40	.29	.40	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	1.35	1.50	...	1.35
tks, wks 100 lb.	...	1.00		1.00	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.75	1.45	1.75	...	1.45
tks, wks 100 lb.	...	1.10		1.10	1.10	1.20
22°, c-l, cbys, wks 100 lb.	...	2.25	1.95	2.25	...	1.95
tks, wks 100 lb.	...	1.60		1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.14	.11	.14
Sludges, drs lb.	...	.05	.05	.10	.06	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. lb.	.10¾	.12	.10¾	.12	.10¾	.12½
Phosphoric, 50%, USP, cbys lb.	.12	.14	.12	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.30	.40
Propionic, 98% wks, drs lb.	...	.20	.20	.22	...	.35
80% lb.	.16	.17½	.16	.17½	.15	.17½
Pyrogallic, crys, kgs, wks lb.	1.55	1.60	1.55	1.65	1.55	1.65
Ricinoleic, bbls lb.	...	.38	.35	.38	...	...
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.40
Sebacic, tech, drs, wks lb.	...	.58	...	.58	...	.58
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.19
Sulfuric, 60°, tks, wks ton	...	12.00	...	12.00	11.00	12.00
c-l, cbys, wks 100 lb.	...	1.25	1.10	1.25	...	1.10
66°, tks, wks ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.35		1.35	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls. lb	.26	.32	.19	.36	.19	.40
Tartaric, USP, gran, powd, 300 lb bbls lb.	.24¾	.25¼	.21¾	.25¼	.22¾	.24
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.72½
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.45	2.75
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	...	2.75	2.50	2.75	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.52	.60	.47	.60	.50	.60
dark, bbls lb.	.11	.15	.11	.17	.12	.17
egg, edible lb.	...	1.05	.76	1.05	.77	1.05
vegetable, edible lb.	.74	.78	.76	.78	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.123	...	.123	.123	.143
c-l, drs, delv lb.	...	.133	...	.133	.133	.150
lcl, drs, delv lb.	...	.143	...	.143	.143	.157
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	.08½	.108
Benzyl, cans lb.	.70	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt allowed lb. *d*	...	.09	.08½	.09	.08½	.11
c-l, drs, f.o.b. wks, frt allowed lb. *d*	...	.10	.09½	.10	.09½	.12
Butyl, secondary, tks, delv lb. *d*	...	.07	...	.07	.07	.096
c-l, drs, delv lb. *d*	...	.08	...	.08	.08	.106
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.50	3.65	2.50	3.65	2.50	3.65
Denatured, CD, No. 1*, 12, 13, c-l, drs, wks gal. *e*	...	.35	.33	.35	.30	.44*
Western schedule, c-l, wks gal. *e*	...	.28	.37	.39	.39	.52*
Denatured, SD, No. 1, tks	...	.27	.26	.27	.23	.28
c-l, drs, wks gal. *e*	...	.33	.32	.33	.29	.34
Diacetone, tech, tks, delv lb. *f*	...	.11½	...	.11½	...	.16
c-l, drs, delv lb. *f*	...	.12½	...	.12½	...	.17
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.06	4.05	4.07	4.07	4.10
c-l, drs gal. *g*	...	4.12	4.11	4.12	4.11	4.27
c-l, bbls gal. *g*	...	4.13	4.12	4.13	4.12	4.28
absolute, drs gal. *g*	4.54	6.08½	4.54	6.08½	4.54	6.11½

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls. *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers were given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Alcohols (continued)						
Furfuryl, tech, 500 lb drs	lb.	.30	.35	.30	.35	.35
Hexyl, secondary tks, delv	lb.	...	.12	.11½	.12	.11½
c-l, drs, delv	lb.	...	.13	.12½	.13	.12½
Normal, drs, wks	lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks	lb.	...	.32	...	.32	...	.32
drs, lcl, delvd	lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs	lb.	...	.10	...	.10	.10	.12
c-l, drs	lb.	...	.09½	...	.09½	.09½	.11½
tks	lb.	...	.08½	...	.08½	.08½	.10½
Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed	lb.	...	.39½	.39½	.45	.45	.55
Propyl, norm, 50 gal drs	gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks	gal.	...	.28	.27	.28	.24	.32
Aldehyde ammonia, 100 gal drs	lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls	lb.	...	.52	...	.52	.52	.65
Alphanaphthylamine, 350 lb bbls	lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks	100 lb.	...	3.25	3.00	3.25	...	3.00
delv NY., Phila	100 lb.	...	3.40	3.15	3.40	...	3.15
less than 25 bbls, wks	100 lb.	...	3.50	3.25	3.50	...	3.25
Granular, c-l, bbls. wks	100 lb.	...	3.00	2.75	3.00	...	2.75
Powd, c-l, bbls, wks	100 lb.	...	3.40	3.15	3.40	...	3.15
Chrome, bbls	100 lb.	7.00	7.25	7.00	7.25	7.00	7.25
Potash, lump, c-l, bbls, wks	100 lb.	...	3.50	3.25	3.50	...	3.25
25 bbls or more, wks	100 lb.	...	3.75	3.40	3.75	...	3.40
Granular, c-l, bbls, wks	100 lb.	...	3.25	3.00	3.25	...	3.40
25 bbls or more, bbls, wks	100 lb.	...	3.50	3.25	3.50	...	3.00
Powd, c-l, bbls, wks	100 lb.	...	3.65	3.40	3.65	...	3.40
25 bbls or more, wks	100 lb.	...	3.90	3.55	3.90	...	3.55
Soda, bbls, wks	100 lb.	...	3.25	...	3.25	...	...
Aluminum metal, c-l, NY	100 lb.	...	20.00	19.00	20.00	19.00	20.00
Acetate, CP, 20%, bbls	lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks	lb.	.07	.12	.07	.12	.07	.12
93%, wks	lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks	lb.	.06	.06¼	.06	.06¼	.06	.07
Solution, drs, wks	lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03½
Hydrate, 96%, light, 90 lb bbls, delv	lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks	lb.	.029	.03½	.029	.03½	.029	.04½
Oleate, drs	lb.	.16¾	.18½	.16¾	.18½	.15¾	.18½
Palmitate, bbls	lb.	.22	.23	.22	.23	.21	.22
Resinate, pp., bbls	lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls	lb.	.19	.21	.19	.21	.18	.21
Sulfate, com, c-l, bgs, wks	100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks	100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks	100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks	100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs	lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks	lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl	lb.	.16	.22	.16	.22	.15¼	.22
26°, 800 lb drs, delv	lb.	.02¼	.02½	.02¼	.02½	.02¼	.03
Aqua 26°, tks, NH	cont.	...	.05	.04½	.05	.04½	.05
tk wagon	lb.	...	.02	...	.02	.02	.024
Ammonium Acetate, kgs	lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks	100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls	lb.	.16	.17	.16	.17	.15	.17
carbonate, tech, 500 lb bbls	lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks	100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks	100 lb.	5.50	6.25	5.00	6.25	5.00	5.75
Lump, 500 lbs cks spot	lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls	lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls	lb.	...	.23	...	...	...	...
Linoleate	lb.	...	.15	.11	.15	.11	.12
Naphthenate, bbls	lb.	...	.17	...	...	...	...
Nitrate, tech, cks	lb.	.03¾	.04	.03¾	.04	.04	.05
Oleate, drs	lb.	...	.15	.15	.10	...	.10
Oxalate, neut, cryst, powd, bbls	lb.	...	.22½	.22½	.23	.26	.27
pure, cryst, bbls, kgs	lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs	lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs	lb.	.21	.24	.21	.24	.21	.25
Phosphate, dibasic tech, powd, 325 lb bbls	lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls	lb.	...	.15	...	...	...	...
Stearate, anhyd, bbls	lb.	...	.24	...	...	...	...
Paste, bbls	lb.	...	.07½	...	...	...	...
Sulfate, dom, f.o.b., bulk	ton	...	26.50	26.00	27.00	22.00	26.00
200 lb bgs	ton	...	nom.	...	nom.	...	nom.
100 lb bgs	lb.	...	nom.	...	nom.	...	nom.
Sulfocyanide, kgs	lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane)							
tks, delv	lb.	...	.11½	...	.11½	.11½	.13½
tech, drs, delv	lb.	.11½	.12	.11½	.13½	.12½	.149
Secondary, tks, delv	lb.	...	.08½	...	.08½	...	.108
c-l, drs, delv	lb.	...	.09½	...	.09½	.11[g]	.123
Chloride, norm, drs, wks	lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks	lb.	.07	.077	.07	.077	.07	.077
tks, wks	lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks	lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs	lb.	...	.25	...	.25	...	...
Stearate, lcl, wks, drs	lb.	...	.26	...	.26	...	...

[g] Grain alcohol 20c a gal. higher in each case.

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Amylene, drs, wks	lb.	.102	.11	.102	.11	.102	.11
tks, wks	lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks	lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine	lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80%	lb.	...	.75	...	.75	...	.75
40%	lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls	lb.	...	.65	.50	.65	.50	.52
Antimony metal slabs, ton lots	lb.	...	.15⅜	.13⅝	.17	.11⅜	.14
Butter of, see Chloride.							
Chloride, soln cbys	lb.	...	.17	...	.17	.13	.17
Needle, powd, bbls	lb.	.16½	.18½	.14	.19½	.11	.12½
Oxide, 500 lb bbls	lb.	.15½	.16½	.14¼	.16½	.12¾	.14
Salt, 63% to 65%, tins	lb.	.23¾	.24	.22	.24	.22	.24
Sulfuret, golden, bbls	lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls	lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls	lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks	lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl	lb.	.08½	.09	.08½	.09¾	.08¾	.09¾
Arsenic, Metal	lb.	.42	.44	.42	.44	.40	.44
Red, 224 lb cs kgs	lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs	lb.	.03	.04	.03	.04	.03	.04½
Barium Carbonate precip, 200 lb bgs, wks	ton	52.50	62.50	52.50	62.50	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs	ton	...	44.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs, N Y	lb.	.16½	.17½	.16½	.17½	.15½	.17½
Chloride, 600 lb bbls, wks	ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs	lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls	lb.	.04¾	.05½	.04¾	.05½	.05¼	.06
Nitrate, bbls	lb.	.07	.08¼	.07	.08¼	.07	.08¼
Barytes, floated, 350 lb bbls wks	ton	...	23.65	23.65	23.65	23.65	23.65
Bauxite, bulk, mines	ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs, wks	ton	...	16.00	...	16.00	...	16.50
No. 2	ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks	lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed	gal.	...	.16	...	.16	.16	.18
90% c-l, drs	gal.	...	.21	...	.21	...	.23
Ind pure, tks, frt allowed	gal.	...	.16	...	.16	.16	.18
Benzidine Base, dry, 250 lb bbls	lb.	.70	.72	.70	.72	.70	.74
Benzoyl Chloride, 500 lb drs	lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs	lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks	lb.	.23	.24	.23	.24	.24	.27
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls	lb.	.51	.52	.51	.52	.51	.55
Bismuth metal	lb.	1.00	1.10	1.00	1.10	1.00	1.10
Chloride, boxes	lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes	lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes	lb.	...	2.95	2.75	3.04	2.95	3.00
Subbenzoate, boxes	lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs	lb.	1.23	1.58	1.23	1.58	1.40	1.45
Trioxide, powd, boxes	lb.	...	3.57	3.45	3.57	3.45	3.50
Subnitrate	lb.	1.22	1.48	1.22	1.48	1.30	1.35
Blackstrap, cane (see Molasses, Blackstrap).							
Blanc Fixe, 400 lb bbls, wks	ton	40.00	75.00	40.00	75.00	42.50	70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract	100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks	lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY	unit	...	3.50	3.50	4.30	2.50	4.25
Chicago, high grade	unit	...	3.15	3.15	4.65	2.90	4.50
Imported shipt	unit	...	3.40	3.40	4.10	2.60	3.75
Blues, Bronze Chinese Milori							
Prussian Soluble	lb.	.36	.37	.36	.37	.37	.38½
Ultramarine,* dry, wks, bbls	lb.	...	.10	...	.10	...	.10
Regular grade, group 1	lb.	...	.15	...	.15	...	.15
Special, group 1	lb.	...	.18	...	.18	...	.18
Pulp, No. 1	lb.	...	.26	...	.26	...	.26
Bone, 4½ + 50% raw, Chicago	ton	29.00	30.00	26.00	28.00	20.00	25.00
Bone Ash, 100 lb kgs	lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls	lb.	.06½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp	ton	...	26.00	25.00	27.50	23.00	26.00
Domestic, bgs, Chicago	ton	25.00	27.00	19.00	27.00	16.00	20.00

BORAX

Borax, tech, gran, 80 ton lots, sacks, delv	ton[i]	...	42.00	40.00	42.00	...	40.00
bbls, delv	ton[i]	...	52.00	50.00	52.00	...	50.00
Tech, powd, 80 ton lots, sacks	ton[i]	...	47.00	45.00	47.00	...	45.00
bbls, delv	ton[i]	...	57.00	56.00	57.00	...	56.00
Bordeaux Mixture, consumers, East, c-l, tins, drs, cases	lb.	.10½	.11	.10½	.11	.08	.16
Dealers, East, c-l	lb.	.10	.10½	.10	.10½	.08½	.16½

[h] Lowest price is for pulp, highest for high grade precipitated; [i] Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

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Bromine
Chromium Fluoride

Prices

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Bromine, cases ..... lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.90½	.92½	.80	1.50	.80	1.50
Gold, blk ..... lb.	.45	.65	.40	.65	.40	.55
Butanes, com 16-32° group 3 tks ..... lb.	.02¼	.03¾	.02¼	.03¾	...	.04
Butyl, Acetate, norm drs, frt allowed ..... lb.	.10	.10½	.10	.10½	.09½	.12½
tks, frt allowed ..... lb.	...	.09	...	.09	.08½	.11
Secondary, tks, frt allowed ..... lb.	...	.07	.07	.07½	.07½	.096
drs, frt, allowed ..... lb.	.08	.08½	.08	.09	.106	.111
Aldehyde, 50 gal drs, wks ..... lb.	...	.17½	.16½	.17½	.19	.21
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate ..... lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed .. lb.	...	.25	...	.25	...	...
Propionate, drs ..... lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv ..... lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs .... lb.	...	.26	.25	.26	...	.26
Tartrate, drs ..... lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	...
Cadmium Metal ..... lb.	...	1.20	1.05	1.20	.75	1.05
Sulfide, orange, boxes ... lb.	1.50	1.60	.90	1.60	.90	1.10
CALCIUM						
Calcium, Acetate, 150 lb bgs c-l, delv ..... 100 lb.	...	2.25	2.10	2.25	...	2.10
Arsenate, jobbers, East of Rocky Mts, drs ..... lb.	.06¼	.06½	.06	.06½	.06	.06½
dealers, drs ..... lb.	.06¾	.07¾	.06¼	.07¾	.06¼	.07¾
South, dealers, drs ... lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
Carbide, drs ..... lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ..... lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, delv ..... ton	...	22.00	...	22.00	...	22.00
Solid, 650 lb drs, c-l, delv ..... ton	...	20.00	...	20.00	...	20.00
Ferrocyanide, 350 lb bbls wks ..... lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls ..... lb.	.50	.57	.50	.57	.50	.57
Nitrate, 100 lb bgs .... ton	...	26.10	...	26.10	...	26.50
Palmitate, bbls ..... lb.	.22	.23	.22	.23	.21	.22
Phosphate, tech, 450 lb bbls ..... lb.	.06½	.07½	.06½	.07½	.07½	.08
Resinate, precip, bbls ... lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ... lb.	.19	.21	.19	.21	.18	.21
Camphor, slabs ..... lb.	...	.55	...	.55	.50	.56
Powder ..... lb.	...	.55	...	.55	.4940	.56
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs lb.	.05	.05¼	.05	.05¼	.05¼	.08
Black, c-l, bgs, delv, price varying with zone .... lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv ..... lb.	...	.07¼	...	.07¼	...	.07¼
cases, delv ..... lb.	...	.08¼	...	.08¼	...	.08¼
Decolorizing, drs, c-l ... lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv ..... lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.13	.14	.13	.20¾	.14½	.20¾
80-100 mesh, c-l, bgs ... lb.	.13½	.14½	.13½	.21¼	.15	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks ..... ton	...	23.00	23.00	25.00	15.00	20.00
Imported, ship, bgs .... ton	...	nom.	.	nom.	17.00	18.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.17	.18
Transparent, cs ..... lb.	.12	.13	.12	.13	...	.20
Cellulose, Acetate, 50 lb kgs ..... lb.	...	.40	.40	.55	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks ..... lb.	.03¾	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks ..... bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* .... ton	23.00	34.00	23.00	34.40	23.00	34.00
Willow, powd, 100 lb bbl, wks ..... lb.	.06	.07	.06	.07	.06	.06¼
Chestnut, clarified, tks, wks lb.	...	.02125	.01625	.02125	.01625	.01⅞
25%, bbls, wks ..... lb.	...	.0225	.02	.0225	.01½	.02
Pwd, 60%, 100 lb bgs, wks ..... lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	6.50	...	6.50	...	7.00
Imported, lump, blk ... ton	22.00	25.00	22.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract ..... lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ... lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont ..... lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks ..... lb.	3.00	3.50	3.00	3.50	...	3.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks ..... lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ..... lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ..... lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls .. lb.	...	.80	.	.80	.85	.90
Chrome, Green, CP ..... lb.	.21	.24	.20	.24	.21½	.23
Yellow ..... lb.	.14½	.15½	.13	.16½	.11	.14
Chromium, Acetate, 8% Chrome, bbls ..... lb.	.05	.08	.05	.08	.06	.08
20° soln, 400 lb bbls ... lb.	.	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl ..... lb.	.27	.28	.27	.28	.27	.28

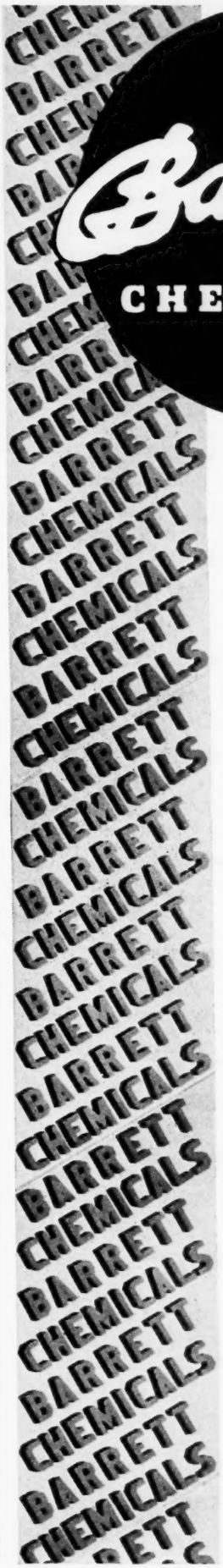
j A delivered price; * Depends upon point of delivery.

Current

Coal Tar Dinitrotoluene

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Coal tar, bbls .....bbl.	7.00	8.00	6.75	9.00	7.25	9.00
Cobalt Acetate, bbls .....lb.	.66	.68	.58	.68	.58	.60
Carbonate tech, bbls ....lb.	...	1.63	1.42¾	1.63	1.35	1.48
Hydrate, bbls .....lb.	...	1.78	1.60	1.78	1.66	1.76
Linoleate, solid, bbls ...lb.	...	.33	.31	.33	.30	.31¼
Oxide, black, bgs .....lb.	...	1.67	1.41	1.67	1.29	1.49
Resinate, fused, bbls ...lb.	...	.13½	.13	.13½	.12½	.13
Precipitated, bbls ....lb.	...	.34	.30½	.34	...	.32
Cochineal, gray or bk bgs..lb.	.32	.36	.32	.36	.32	.36
Teneriffe silver, bgs ....lb.	.33	.37	.33	.37	.33	.37
Copper, metal, electrol 100 lb.	...	14.00	13.00	16.25	9.50	12.00
Carbonate, 400 lb bbls ..lb.	.10½	.12½	.10½	.12½	...	.08¼
52-54% bbls .....lb.	...	.18	.16¼	.19	.14½	.16¼
Chloride, 250 lb bbls ...lb.	.15	.17	.15	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls .....lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks..lb.	...	nom.	.17½	.18	.14½	.15¾
red 100 lb bbls .....lb.	...	nom.	.17	.18	.14	.15
Resinate, precip, bbls ...lb.	.15	.16	.15	.19	.18	.19
Stearate, precip, bbls ...lb.	.23	.24	.23	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls .....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	5.15	4.55	6.00	3.85	4.55
Copperas, crys and sugar bulk c-l, wks .....ton	12.00	13.00	12.00	13.00	13.00	16.00
Corn Sugar, tanners, bbls 100 lb.	...	3.79	3.74	4.34	3.08	4.03
Corn Syrup, 42°, bbls..100 lb.	...	3.91	3.76	4.36	3.05	3.95
43°, bbls .....100 lb.	...	3.96	3.86	4.41	3.10	4.05
Cotton, Soluble, wet, 100 lb bbls .....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls .....lb.	.19¾	.20¼	.15	.20¼	.15	.16¾
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks .....gal.	.13½	.14	.13	.14	.12½	.13½
Grade 2 .....gal.	.118	.128	.113	.128	.109	.12
Cresol, USP, drs .....lb.	.12½	.13	.10	.13	.10	.10½
Crotonaldehyde, 98%, drs, wks .....lb.	.26	.30	.26	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.04	.04¾	.04	.04¾	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	...	1.15	1.10	1.15	1.07½	1.10
Derris root 5% rotenone, bbls .....lb.	.39	.47	.39	.47	...	...
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	4.25	4.45	4.25	5.00	3.45	5.00
British Gum, bgs ...100 lb.	4.60	4.70	4.60	5.25	3.70	5.40
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ...lb.	...	.08	...	.08	...	.08
White, 140 lb bgs ..100 lb.	4.30	4.58	4.30	4.58	3.40	4.95
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.75	1.00
Diamylene, drs, wks .....lb.	.095	.102	.095	.102	.095	.102
tks, wks .....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks .....lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ..lb.	...	.30	...	.30	...	...
Diamylphthalate, drs, wks lb.	.20½	.21	.19	.21½	.18	.19½
Diamyl Sulfide, drs, wks ..lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls .....lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutoxy Ethyl Phthalate, drs, wks .....lb.	...	.35	...	.35	...	...
Dibutyl Ether, drs, wks, lcl lb.	...	.30	...	.30	...	...
Dibutylphthalate, drs, wks, frt allowed .....lb.	...	.21	.19½	.21	.18	.21
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.50	.35	.40
Dichlorethylene, drs .....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks .....lb.	.15	.16	.15	.16	.16	.17
tks, wks .....lb.	...	.14	...	.14	...	.15
Dichloromethane, drs, wks lb.	...	.23	...	.23	.	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		.032	.040
tks, wks .....lb.	no prices		no prices		.	.02½
Diethanolamine, tks, wks..lb.	...	.25	.25	.35	.	.30
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs..lb.	.50	.52	.50	.52	.50	.55
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs .....lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.18	.19½	.18	.19
Diethylsulfate, tech, drs, wks, lcl .....lb.	...	.20	...	.20	.	.20
Diethyleneglycol, drs .....lb.	.22	.23	.16½	.23	.15½	.17½
Mono ethyl ethers, drs..lb.	.16	.17	.16	.17	.15	.17
tks, wks .....lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks .....lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls .....lb.	...	.21	.21	.24	...	.24
Laurate, bbls .....lb.	...	.27½	...	...	...	.
Stearate, bbls .....lb.	...	.27½	...	...	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis .....lb.	.	1.00	.	.95	.	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.30
Dimethyl Ethyl Carbinol, drs lb	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed .....lb.	.	.21	.20½	.21	.19½	.21½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. k	.16	.19	.16	.19	.16	.19½
Dinitrochlorobenzene, 400 lb bbls .....lb.	.16½	.17½	.16	.17½	.14	.15½
Dinitronaphthalene, 350 lb bbls .....lb.	.35	.38	.35	.38	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.14½	.15½	.14½	.15½	.14½	.16½

k Higher price is for purified material.



Barrett Chemicals are produced under strict laboratory control to meet rigid specifications established during 83 years of successful manufacturing service. They are available in large or small quantities, and Barrett service is included with every order—prompt dependable deliveries and the coöperation of the Barrett Technical Service Bureau. Phone, wire or write for quotations.

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AD-VENTURES OF A Chemist

By Edward Rosendahl

An Oil That Is Non-Hygroscopic

Chemists in many fields have found important uses for *DIGLYCOL LAURATE. This brief description may suggest an application to you. It is a light colored, non-hygroscopic oil completely soluble in alcohol. It is self-emulsifying in cold water and is an excellent emulsifying agent for oils and hydrocarbon solvents. It is being used for TEXTILES (lubrication, scouring, sizing, finishing, etc.), PAPER (sizing, and coating), LEATHER (lubricating and finishing), and for making COSMETICS and POLISHES. Being non-toxic it is ideal for edible products where binding properties are desirable.

This Self-Emulsifying Wax Has Solved Many A Problem

*DIGLYCOL STEARATE (Reg. Trademark) is a white, wax-like solid with melting point of 54° C. It is self-emulsifying in hot water and also acts as an emulsifying agent for waxes, oils, hydrocarbons and paste emulsions. It forms stable emulsions which in many cases can be frozen without breaking. Chemists are using it for Paper, Leather, Polishes, Textiles, Cosmetics, Lubrications and for many other purposes.

Troubled From Foam?

If your solutions of glue, casein, shellac etc. give you foam trouble, all you need do is this. Add about 1½ ounces of FOAMEX to 12 gallons of your solution, and your troubles will be over! This new product not only dissipates foam in the mixing tank, but eliminates specks and pinholes in the finished product. FOAMEX can be added either to the water before mixing or thrown into the finished solution. It's a big help in the manufacture of paper coatings, latex compositions, leather finishes, textile finishes and sizings, and adhesives.

Need A Preservative?

Here are three materials that will give safe protection against spoilage, mold, rancidity and fermentation: MOLDEX, a light colored crystalline powder for preserving water solutions and emulsions containing vegetable gums, casein, glue, gelatine, albumen, sugar, starch, etc. ASEPTEX (Tech), a white powder that preserves technical water solutions and emulsions. RANCIDEX, a gray powder used to prevent rancidity, discoloration and offensive odors in oils, fats, greases, etc. Why not send $2.60 (the cost of materials and handling) and get our sample assortment of all three (¼ lb. of each)? Then you can quickly determine the one best suited for your purpose.

If you have a hunch that any of these materials might apply to a problem of yours, let us know and we'll send samples and full information. Or tell us what your problem is . . . maybe we can be of assistance to you.

GLYCO PRODUCTS COMPANY, INC.
148 Lafayette St., (Dept. 37) New York, N. Y.

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*Propylene Glycol Stearate — *Propylene Glycol Laurate
Glyceryl Monostearate — *Glyceryl Bori-Borate
*Glycol Oleate — Ammonium Stearate (anhydrous)
*Glycol Bori-Borate — Glyceryl Monoricinoleate

* The manufacture and use of these products are governed by U. S. Patents. No license fee or royalty for their use is required of Glyco customers, but infringement by others will be vigorously followed up. It is safest to come to Glyco.

Diphenyl
Glue, Casein

Prices

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Diphenyl, bbls	lb.	.15	.25	.15	.25	.15	.25
Diphenylamine	lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs	lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.							
Divi Divi pods, bgs shipmt	ton	34.00	nom.	34.00	nom.	32.00	45.00
Extract	lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK							
Egg Yolk, dom., 200 lb cases	lb.	.68	nom.	.68	nom.	.63	.68
Imported	lb.	...	.57	.53	.57	.48	.56
Epsom Salt, tech, 300 lb bbls c-l NY	100 lb.	1.90	2.10	1.80	2.10	1.80	2.00
USP, c-l, bbls	100 lb.	...	2.10	2.00	2.10	...	2.00
Ether, USP anaesthesia 55 lb drs	lb.	.22	.23	.22	.23	.22	.23
(Conc)	lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs	lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed	lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles	lb.	...	.68	.68	.77	.75	.77
Synthetic, wks, drs	lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt alld	lb.	...	.06½	...	.06½	.06½	.08
drs, frt alld	lb.	...	.07½	...	.07½	.07½	.09
95%, tks, frt allowed	lb.	...	.06¾	...	.06¾	.07	.08½
drs, frt alld	lb.	...	.07¾	...	.07¾	.08	.10
Acetoacetate, 110 gal drs	lb.	...	.27½	...	.27½	.37	.68
Benzylaniline, 300 lb drs	lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs	lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs	lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys	lb.	...	.30	...	.30	...	.30
Crotonate, drs	lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt allowed	lb.	.27	.28	.27	.31	...	...
Lactate, drs, wks	lb.	...	.33	...	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed	lb.	.07	.07½	.07	.07½	.07	.09
tks, frt allowed	lb.	...	.06½	...	.06½	.06½	.07½
Oxalate, drs, wks	lb.	.30	.34	.30	.34	.37½	.55
Oxybutyrate, 50 gal drs, wks	lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks	lb.	...	.77	...	.77	...	...
Ethylene Dibromide, 60 lb drs	lb.	.65	.70	.65	.70	.65	.70
Chloryhdrin, 40%, 10 gal cbys chloro, cont	lb.	.75	.85	.75	.85	.75	.85
Anhydrous	lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks	lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks	lb.	.17	.21	.17	.21	.17	.21
tks, wks	lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks	lb.	.20	.21	.20	.21	.20	.21
tks, wks	lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks	lb.	.16	.17	.16	.17	.16	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks	lb.	...	.14	...	.14	.14	.18½
tks, wks	lb.	...	.13	...	.13	.13	.16½
Mono, Methyl Ether, drs wks	lb.	.18	.22	.18	.22	.19	.23
tks, wks	lb.	.	.17	.	.17	.	.18
Oxide, cyl	lb.	.50	.55	.50	.55	.50	.60
Ethylidenaniline	lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery	ton	.	14.50		14.50	.	14.50
Powd, blk, wks	ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls	lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks	unit *l*	...	3.50	3.50	4.25	2.50	3.50
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis	unit *m*	...	3.00	3.00	3.15	...	2.25
Fluorspar, 98%, bgs	lb.	no prices		no prices		30.00	35.50
Formaldehyde, USP, 400 lb bbls, wks	lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.07
Fossil Flour	lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines	ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs	ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks	lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs	lb.	...	.30	.	.30	...	.30
Fusel Oil, 10% impurities	lb.	.16	.18	.16	.18	.16	.18
Fustic, crystals, 100 lb boxes	lb.	.22	.26	.20	.26	.20	.23
Liquid 50°, 600 lb bbls	lb.	.09½	.13	.08½	.13	.08½	.12
Solid, 50 lb boxes	lb.	.17½	.19½	.16	.19½	.16	.18
G SALT PASTE							
G Salt paste, 360 lb bbls	lb.	.45	.47	.45	.47	.45	.47
Gall Extract	lb.	.19	.20	.19	.20	.18	.20
Gambier, com 200 lb bgs	lb.	...	nom.	...	nom.	...	.06
Singapore cubes, 150 lb bgs	100 lb.	...	.10½	.09½	.10½	.08	.09
Gelatin, tech, 100 lb cs	lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, bgs, wks*	100 lb.	.95	1.15	.95	1.15	.95	1.30
Anhydrous, see Sodium Sulfate.							
Glue, bone, com grades, c-l bgs	lb.	.11	.17½	.11	.17½	.10½	.17½
Better grades, c-l, bgs	lb.	.12½	.17½	.12½	.17½	.12	.17½
Casein, kgs	lb.	.18	.22	.18	.22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

Current

Glycerin
Gum, Hemlock

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Glycerin, CP, 550 lb drs ..lb.	.21½	.21½	.29	.16	.21½
Dynamite, 100 lb drs ...lb.	.21½	.21½	.29	.13¾	.21½
Saponification, drs .....lb.	.16	.15½	.29	.10¼	.22
Soap Lye, drs .....lb.	.14½	.14	.27	.09¾	.20
Glyceryl Bori-Borate, bbls lb.	...	...	...	...	...
Monoricinoleate, bbls ...lb.	...	...	...	...	...
Monostearate, bbls .....lb.	...	...	...	...	...
Oleate, bbls .....lb.	...	...	...	...	...
Phthalate .....lb.	...	.29	.37	.28	.29
Glyceryl Stearate, bbls ...lb.	...	...	.18	...	.18
Glycol Bori-Borate, bbls ..lb.	...	...	...	...	...
Phthalate, drs .....lb.	...	.23	.40	.29	.35
Stearate, drs .....lb.	...	.23	.27½	...	.23

GUMS

Gum Aloes, Barbadoes ....lb.	.85	.85	.90	.85	.90	.90
Arabic, amber sorts .....lb.	.13	.10½	.15½	.09	.10¾	.13½
White sorts, No. 1, bgs..lb.	.29	.27	.30	.25	.28	.30
No. 2, bgs .....lb.	.27	.25	.28	.24	.26	.28
Powd, bbls .....lb.	.16½	.14	.19	.13	.14	.17
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY .....lb.	.02½	.02½	.10½	.02½	.10½	.10½
California, f.o.b., NY, drs ton	29.00	29.00	55.00	29.00	55.00	55.00
Egyptian, 200 lb cases, f.o.b., NY .....lb.	.12	.12	.15	.12	.15	.15
Benzoin Sumatra, USP, 120 lb cases .....lb.	.22	.16	.25	.15	.19	.22
Copal, Congo, 112 lb bgs, clean, opaque .....lb.	...	.18⅞	.19¼	.18½	.20	.20
Dark amber .....lb.	...	.06⅞	.08¼	.06⅞	.08	.08¼
Light amber .....lb.	...	.10¼	.13⅛	.10¼	.14⅛	.13⅜
Copal, East India, 180 lb bgs						
Macassar pale bold .....lb.	...	.13	...	.13	.12⅝	.14
Chips .....lb.	...	.06½	...	.06½	.06⅛	.06½
Dust .....lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs .....lb.	...	.10¾	.10¾	.11¼	.10⅜	.11⅛
Singapore, Bold .....lb.	...	.15⅝	...	.15⅝	.15⅛	.16⅞
Chips .....lb.	...	.04¾	.04¼	.05	.04⅜	.05¼
Dust .....lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅜
Nubs .....lb.	...	.10⅜	.10⅜	.10¾	.10	.11¼
Copal Manilla, 180-190 lb baskets, Loba A .....lb.	...	.10¼	.09¾	.10¼	.09¼	.13
Loba B .....lb.	...	.10¼	.09¼	.10¼	.08⅞	.12
Loba C .....lb.	...	.10¼	.08⅞	.10¼	.08⅜	.11⅜
DBB .....lb.	...	.08⅜	.08	.08⅜	.07⅝	.08⅞
Dust .....lb.	...	.06⅝	.05¾	.06⅝	.05	.06⅛
MA sorts .....lb.	...	.07¼	.06¾	.07¼	.06¾	.07⅝
Copal Pontianak, 224 lb cases, bold genuine .....lb.	...	.16	.15½	.16	.14¼	.16
Chips .....lb.	...	.10¼	.09⅛	.11⅛	.07	.08½
Mixed .....lb.	...	.14	.13½	.14	.13¼	.13¾
Nubs .....lb.	...	.12⅞	.12¾	.13½	.10¼	.12
Split .....lb.	...	.15¼	.13½	.15¼	.12¾	.13
Dammar Batavia, 136 lb cases						
A .....lb.	...	.24	.23½	.24	.21⅜	.22¼
B .....lb.	...	.22½	.22⅛	.22½	.20⅜	.21½
C .....lb.	...	.18⅞	.18½	.18⅞	.16½	.17⅝
D .....lb.	...	.16⅛	.15¼	.16⅛	.13⅝	.14⅜
A/D .....lb.	...	.18⅞	.17⅝	.18⅞	.15½	.17⅛
A/E .....lb.	...	.15¾	.14⅞	.16⅛	.12⅞	.14½
E .....lb.	...	.08⅛	.07½	.08⅛	.06¼	.07⅛
F .....lb.	...	.06¾	.06¼	.06¾	.05⅞	.06⅞
Singapore, No. 1 .....lb.	...	.21¼	.17⅛	.21¼	.16¼	.17½
No. 2 .....lb.	...	.16¼	.14⅛	.16¼	.13	.14¼
No. 3 .....lb.	...	.05¾	...	.05¾	.05¼	.05¾
Chips .....lb.	...	.12	.10¼	.12	.09¾	.09¾
Dust .....lb.	...	.05¾	.05¾	.06	.04¼	.05⅝
Seeds .....lb.	...	.09½	.07⅞	.09½	.06⅝	.07⅜
Elemi, cons .....lb.	.09⅜	.09½	.09⅜	.10¼	.09¾	.10¼
Ester .....lb.	.10	.10½	.10	.12	.07⅝	.10
Gamboge, pipe, cases ....lb.	.58	.59	.58	.59	.58	.59
Powd, bbls .....lb.	.65	.66	.65	.66	.65	.66
Ghatti, sol. bgs .....lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx..lb.	.27	.30	.24	.30	.24	.25
xx .....lb.	.18	.19	.16	.19	.16	.17
No. 1 .....lb.	.12	.13	.09½	.13	.09½	.10
No. 2 .....lb.	.11	.12	.08½	.12	.08½	.09
Kauri, NY, San Francisco, Brown XXX, cases ....lb.	.60	.60½	.60	.60½	.60	.60½
BX .....lb.	...	.38	.33	.38	.33	.33½
B1 .....lb.	...	.28	.21	.28	.19	.21
B2 .....lb.	...	.24	.15½	.26	.14½	.15½
B3 .....lb.	...	.18½	.12	.18½	.12	.12½
Pale XXX .....lb.	...	.61	.61	.65½	.65	.65½
No. 1 .....lb.	...	.41	.40	.41	.40	.40½
No. 2 .....lb.	...	.24	.22	.24	.22	.22½
No. 3 .....lb.	...	.17¾	.15	.17¾	.15	.15½
Kino, tins .....lb.	1.60	1.70	.70	1.70	.70	.80
Mastic .....lb.	.57	.58	.57	.58	.56	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks ...lb.	.33	.35	.33	.35	.19½	.38
Senegal, picked bgs .....lb.	.27	.29	.20	.29	.20	.21
Sorts .....lb.	.14½	.15	.09¾	.15	.09¾	.12½
Thus, bbls .....280 lbs.	13.75	14.00	12.00	14.00	11.00	12.00
Strained .....280 lbs.	...	14.00	12.00	14.00	11.00	12.00
Tragacanth, No. 1, cases..lb.	2.75	3.00	2.40	3.25	1.20	2.50
No. 2 .....lb.	2.40	2.75	2.00	2.75	1.10	2.10
No. 3 .....lb.	2.35	2.70	1.95	2.70	.95	2.05
No. 4 .....lb.	2.30	2.65	1.85	2.65	.85	1.95
No. 5 .....lb.	2.25	2.50	1.65	2.50	.75	1.75
Yacca, bgs .....lb.	...	.04½	.03¼	.04½	.03¼	.03¾
Helium, cyl (200 cu. ft.) cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls lb.	.18	.34	.16	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks .....lb.	.03	.03¼	.03	.03¼	...	.02⅞
tks .....lb.	...	.02¾	...	.02¾	...	.02½

use

HEYDEN CHEMICALS

FORMALDEHYDE
PARA FORMALDEHYDE
HEXAMETHYLENETETRAMINE
SALICYLIC ACID
METHYL SALICYLATE
BENZOIC ACID
BENZOATE OF SODA
BENZALDEHYDE
TOLYL ALDEHYDE
BENZAL CHLORIDE
BENZOYL CHLORIDE
BENZYL CHLORIDE
CREOSOTE
GUAIACOL
BROMIDES

FACTORY GARFIELD, N.J.

FINE HEYDEN CHEMICALS

FACTORY PERTH AMBOY, N.J.

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Industrial and Pharmaceutical Chemicals

ACETATE of SODA

(Crystals)

SODIUM SULPHIDE

(Fused, broken or flake)

CHLOROPHYLL

(Water, Oil or Alcohol soluble)

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Company

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Niagara Falls, New York

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Phosphorus and phosphorus products. Sodium chlorate. Potassium perchlorate. Oxalic acid

Hexalene
Mangrove

Prices

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Hexalene, 50 gal drs, wks	lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C.							
Group 3, tks	gal.	...	.10½	...	.10½	...	.12
Hexamethylenetetramine, powd, drs	lb.	.35	.36	.35	.36	.35	.39
Hexyl Acetate, secondary, delv, drs	lb.	.13	.13½	.13	.13½	.13	.13½
tks	lb.	...	.12	...	.12	...	.11½
Hoof Meal, f.o.b. Chicago unit		...	3.50	3.50	3.75	2.35	3.00
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride	lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls	lb.	.16	.21	.15	.21	.17	.20
INDIGO							
Indigo, Bengal, bbls	lb.	...	2.40	...	2.40	...	...
Synthetic, liquid	lb.	.16½	.19	.16½	.19	.13	.14
Iodine, Resublimed, kgs	lb.	1.50	1.60	1.50	1.60	1.50	1.75
Irish Moss, ord, bales	lb.	.11	.12	.11	.12	.09	.10
Bleached, prime, bales	lb.	.19	.20	.19	.21	.18	.19
Iron Acetate Liq. 17°, bbls	lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.							
Nitrate, coml, bbls	100 lb.	2.32	3.11	2.32	3.25	2.75	3.25
Isobutyl Carbinol (128-132°C) drs, wks	lb.	.33	.34	.33	.34	.33	.34
tks, wks	lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt allowed	lb.	...	.06½	...	.06½	.06	.07½
drs, frt allowed	lb.	.07½	.08	.07½	.08	.07	.09
Ether, see Ether, isopropyl.							
Keiselguhr, 95 lb bgs, NY, Brown	ton	60.00	70.00	60.00	70.00	60.00	70.00
LEAD ACETATE							
Lead Acetate, f.o.b. NY, bbls, White, broken	lb.	...	.13½	.11½	.13½	.11	.11½
cryst, bbls	lb.	...	.13½	.11½	.13½	.10½	.11½
gran, bbls	lb.	...	.14¼	.12¼	.14¼	.11	.12¼
powd, bbls	lb.	...	.14¼	.12¼	.14¼	.11¼	.12¼
Arsenate, East, drs	lb.	.11½	.12	.11	.12	.09	.10
West, drs	lb.	.11½	.12	.11	.12½	.09	.09¾
Linoleate, solid, bbls	lb.	...	.19	.18	.19	.18	.26½
Metal, c-l, NY	100 lb.	...	6.50	6.00	7.05	4.50	6.00
Nitrate, 500 lb bbls, wks	lb.	.11	.11½	.09	.11½	.09	.09½
Oleate, bbls	lb.	.18½	.20	.15	.20	.15	.16
Red, dry, 95% Pb_3O_4, delv	lb.	.09	.09¼	.08½	.0945	.07	.085
97% Pb_3O_4, delv	lb.	...	.09¼	.08¾	.09¾	.07¼	.08¾
98% Pb_3O_4, delv	lb.	...	.09½	.09	.10	.07½	.09
Resinate, precip, bbls	lb.	...	.16½	.14	.16½	...	.14
Stearate, bbls	lb.	.22	.23	.22	.23	.22	23
Titanate, bbls, c-l, f.o.b. wks, frt allowed	lb.	...	.12	.10	.12	.	.
White, 500 lb bbls, wks	lb.	...	.08	.07¼	.09	.06½	.07¼
Basic sulfate, 500 lb bbls, wks	lb.	...	.07½	.06¾	.08¾	.06	.06½
Lime, chemical quicklime, f.o.b., wks, bulk	ton	6.00	8.00	6.00	8.00	7.00	7.25
Hydrated, f.o.b., wks	ton	8.00	12.00	8.00	12.00	8.50	12.00
Lime Salts, see Calcium Salts.							
Lime sulfur, dealers, tks	gal.	...	.11	...	.11	...	.11
drs	gal.	.13	.16	.13	.16	.13	.16
Linseed Meal, bgs	ton	...	38.00	35.00	42.50	29.00	40.50
Litharge, coml, delv, bbls	lb.	...	.08	.07½	.08½	.06	.075
Lithopone, dom, ordinary, delv, bgs	lb.	.04⅜	.04⅝	.04¼	.04⅝	.04¼	.04¾
bbls	lb.	.04⅝	.04⅞	.04½	.04⅞	.04½	.05
High strength, bgs	lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls	lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Titanated, bgs	lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls	lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Logwood, 51°, 600 lb bbls	lb.	.09½	.11½	.08½	.11½	.06½	.10½
Solid, 50 lb boxes	lb.	.15	.19	.15	.17½	.13½	.17½
Sticks	ton	24.00	25.00	24.00	25.00	24.00	26.00
MADDER							
Madder, Dutch	lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl	ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks	lb.	.06¼	.07	.06	.07	.06	.06½
Chloride flake, 375 lb drs, c-l, wks	ton	39.00	42.00	39.00	42.00	36.00	42.00
Fluosilicate, crys, 400 lb bbls, wks	lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls	lb.	.36	.40	.36	.40	...	.42
Heavy, 250 lb bbls	lb.	...	.50	...	.50	...	.50
Palmitate, bbls	lb.	.33	nom.	.33	nom.	.23	.24
Silicofluoride, bbls	lb.	.09½	.10½	.09½	.10½	...	...
Stearate, bbls	lb.	.21	.24	.21	.24	.20	.24
Manganese acetate, drs	lb.	...	.26½	.25½	.26½	...	...
Borate, 30%, 200 lb bbls	lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks	lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l	ton	...	47.50	...	47.50	...	47.50
Hydrate, bbls	lb.	...	.32	...	.32	...	...
Linoleate, liq, drs	lb.	.18	.19¼	.18	.19¼	...	...
solid, precip, bbls	lb.	...	.19	.17½	.19	...	...
Resinate, fused, bbls	lb.	.08¼	.08½	.08¼	.08½	...	...
precip, drs	lb.	...	.12	...	.12	...	...
Sulfate, tech, anhyd, 90-95%, 550 lb drs	lb.	.07	.07½	.07	.07½	...	...
Mangrove, 55%, 400 lb bbls	lb.	...	.04	...	.04	...	.04
Bark, African	ton	25.00	26.00	25.00	27.00	25.50	27.00

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Mannitol, pure cryst, cs, wks	lb.	...	1.45	1.45	1.48	1.48	1.60
Marble Flour, blk	ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel)	lb.	1.59	1.60	1.05	1.60	.81	1.20
Mercury metal ...76 lb. flasks		92.00	94.00	92.00	99.00	73.50	95.00
Meta-nitro-aniline	lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls	lb.	1.45	1.55	1.45	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls	lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls	lb.	.65	.67	.65	.67	.65	.69
Methanol, denat, grd, drs, c-l, frt all'd	gal.	...	.44	.44	.53	...	...
tanks, frt all'd	gal.	...	.38	.38	.48	...	...
Pure, drs, c-l, frt all'd	gal.	...	.38	...	.38	...	...
tanks	gal.	...	.33	...	.33	...	...
95%, tks	gal.	...	.31	...	.31	...	...
97%, tks	gal.	...	.32	...	.32	...	...
Methyl Acetate, dom, 98-100%, drs	lb.	.16	.17½	.16	.17½	.11	.18½
Acetone, frt all'd, drs	gal. *p*	.39	.45	.39	.58½	.45½	.68½
tks, frt allowed, drs	gal. *p*	.33	.37	.33	.44½	.41	.48
Synthetic, frt all'd, east of Rock M., drs	gal. *p*	.42	.51	.42	.59½	.52½	.60
tks, frt all'd	gal.	.36	.39½	.36	.49½	.48	.53
West of Rocky M., frt all'd, drs	gal. *p*	...	.46	.46	.58	.55½	.69
tks, frt all'd	gal. *p*	...	.39½	.39½	.51	.51	.63½
Anthraquinone	lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks	lb.	...	.10½	.	.10½	...	.10½
Chloride, 90 lb cyl	lb.	.32	.40	.32	.43	...	.45
Ethyl Ketone, tks	lb.	.	.07½	.	.07½	...	.07½
Formate, drs, frt allowed	lb.	.35	.36	.35	.39	...	...
Hexyl Ketone, pure, drs	lb.	...	.60	...	.60	...	.60
Lactate, drs, frt allowed	lb.	...	.30	...	.30	...	...
Propyl carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks	lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs	lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY	gal.	...	.07¼	...	.07¼	.07	.08¼
Monoamylamine, c-l, drs, wks	lb.	.52	1.00	.52	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.							
Monoethanolamine, tks, wks	lb.	...	.25	.25	.30	...	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l	lb.	...	.65	...	.65	...	...
Monomethylparaminosulfate, 100 lb drs	lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls	lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes	lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs	ton	...	29.00	26.50	29.50	22.00	26.50
J2 bgs	ton	...	20.50	19.00	20.75	14.25	16.75
R2 bgs	ton	...	20.00	18.75	20.25	14.00	16.25
NAPHTHA							
Naphtha, v.m.&p. (deodorized) see petroleum solvents.							
Naphtha, Solvent, water-white, tks	gal.	...	.31	...	.31	...	.31
drs, c-l	gal.	...	.36	...	.36	...	.36
NAPHTHALENE							
Naphthalene, dom, crude, bgs, wks	lb.	...	2.50	2.00	3.00	2.75	4.50
Imported, cif, bgs	lb.	...	2.25	2.25	3.00	...	...
Balls, flakes, pks	lb.	...	.08	...	.08	.07¼	.08
Balls, ref'd, bbls, wks	lb.	...	.07¼	...	.07¼	.06¾	.07¼
Flakes, ref'd, bbls, wks	lb.	...	.07¼	...	.07¼	.06¾	.07¼
Nickel Carbonate, bbls	lb.	.36	.37½	.36	.37½	...	.36
Chloride, bbls	lb.	.18	.20	.18	.20	.18	.19
Metal ingot	lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY	lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs	lb.	...	.76	...	.76	.75	1.17
Nitre Cake, blk	ton	...	16.00	...	16.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks	lb.	.08	.10	.08	.10	.08	.11
tks	lb.	...	.07½	...	.07½	...	.08½
Nitrocellulose, c-l-l c-l, wks	lb.	.22	.29	.26	.29	.26	.34
Nitrogenous Mat'l, bgs, imp	unit	...	3.15	3.15	3.55	2.00	3.10
dom, Eastern wks	unit	...	2.90	2.90	4.25	1.90	3.00
dom, Western wks	unit	...	2.85	2.85	3.75	1.85	2.75
Nitronaphthalene, 550 lb bbls	lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs	lb.	.20	.22	.20	.22	.16	.18
Chinese, bgs	lb.	.20	.22	.20	.22	.19	.20
OAK BARK							
Oak Bark Extract, 25%, bbls	lb.	...	.03½	...	.03½	...	.03½
tks	lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks	lb.	.16	.17	.16	.17	...	.15
Orange-Mineral, 1100 lb cks NY	lb.	...	.12	.11¼	.12¾	.10	.11¼
Orthoaminophenol, 50 lb kgs	lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs	lb.	.70	.74	.70	.74	.82	.84
Orthochlorophenol, drs	lb.	.35	.75	.35	.75	.50	.65
Orthocresol, drs, wks	lb.	.13½	.14½	.13½	.14½	.13	.15
Orthodichlorobenzene, 1000 lb drs	lb.	.06	.07	.05	.07	.05	.11½

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

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Caustic Soda

Potassium Carbonate

Oxalic Acid

Phosphorus Compounds

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Persulphate of Ammonia

Persulphate of Potash

Aluminum Stearate

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IMPERIAL

OIL & GAS PRODUCTS CO.

LABORATORY CONTROL UNIFORM QUALITY

Grant Building Pittsburgh, Pa.

Orthonitrochlorobenzene
Phloroglucinol

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Orthonitrochlorobenzene, 1200 lb drs, wks ..... lb.	.28	.29	.28	.29	.28	.29
Orthonitroparachlorphenol, tins ..... lb.	.70	.75	.70	.75	.70	.75
Orthonitrophenol, 350 lb drs ..... lb.	.85	.90	.85	.90	.52	.80
Orthonitrotoluene, 1000 lb drs, wks ..... lb.	.07	.10	.07	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l ..... lb.	.16	.17	.14	.17	.14	.15
Osage Orange, cryst, bbls .. lb.	.17	.25	.17	.25	.17	.25
51° liquid ..... lb.	.07	.08	.07	.08	.07	.07¾
Paraffin, rfd, 200 lb cs slabs 122-127° M P ..... lb.	.0445	.04½	.0445	.04½	.0445	.04½
128-132° M P ..... lb.	.04¾	.049	.04¾	.049	.04¾	.049
133-137° M P ..... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Para aldehyde, 110-55 gal drs ..... lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ..... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ..... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ..... lb.	.30	.45	.30	.45	.50	.65
Dichlorobenzene, 200 lb drs, wks ..... lb.	.16	.18	.16	.20	.16	.20
Formaldehyde, drs, wks .. lb.	.34	.35	.34	.35	.34	.39
Nitroacetanilid, 300 lb bbls ..... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ..... lb.	.45	.47	.45	.47	.47	.51
Nitrochlorobenzene, 1200 lb drs, wks ..... lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ..... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.45	.50
Nitrosodimethylaniline, 120 lb bbls ..... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	.36	.37
Para Tertiary amyl phenol, wks, drs, c-l ..... lb.	...	.26	...	.26	.26	.50
Phenylenedamine, 350 lb bbls ..... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ..... lb.	.70	.75	.70	.75	.70	.75
tks, wks ..... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ..... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ..... lb.	.56	.58	.56	.58	.56	.60
Paris Green, dealer, drs, frt E. of Cleveland ..... lb.	.22	.24	.22	.24	...	.24
Pentane, normal, 28-38° C, group 3, tks ..... gal.	...	.08½	.08½	.09½	.09	.09½
drs, group 3 ..... gal.	.14	.16	.12½	.16	.10	.16
Perchlorethylene, 100 lb drs, frt allowed ..... lb.	...	.10½	...	.10½	.10½	.15
Petrolatum, dark amber, bbls ..... lb.	.02⅞	.03	.02⅝	.03	.02⅝	.02⅞
Light, bbls ..... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls ..... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls ..... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls ..... lb.	.02⅝	.03¼	.02⅛	.03¼	.02⅛	.02⅝
White, lily, bbls ..... lb.	.06	.06¼	.06	.06¼	.06	.06¼
White, snow, bbls ..... lb.	.07	.07¼	.07	.07¼	.07	.07¼
Petroleum Ether, 30-60°, group, 3 tks ..... gal.	...	.13	...	.13	...	.13
drs, group 3 ..... gal.	.14	.17	.15	.17	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ..... gal.	.07⅜	.07⅞	.07⅜	.07⅞	.07⅜	.07½
Bayonne, tks, wks .. gal.	...	.10	.09½	.10	.09	.09½
West Coast, tks .... gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ... gal.	...	.16	...	.16	.15	.16
No. 2, tks ..... gal.	...	.18	...	.18	...	.18
No. 3, tks ..... gal.	...	.16	...	.16	...	.15
No. 4, tks ..... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks Bayonne ..... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ..... gal.	.08⅜	.08⅞	.08⅜	.08⅞	.07⅞	.08½
Naphtha, V.M.P., East, tks, wks ..... gal.	...	.11	.10	.11	.09	.10
Group 3, tks, wks ... gal.	.07⅜	.07⅞	.07⅜	.07⅞	.07⅜	.07½
Petroleum thinner, East, tks, wks ..... gal.	...	.10	.09	.10	.09	.09½
Group 3, tks, wks ... gal.	.06⅜	.06⅞	.06⅜	.06⅞	.06⅜	.06⅝
Rubber Solvents, stand grd, East, tks, wks ..... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	.07⅜	.07⅞	.07⅜	.07⅞	.07⅜	.07½
Stoddard Solvent, East, tks, wks ..... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	.06⅞	.07⅜	.06⅞	.07⅜	.06⅞	.07
Phenol, 250-100 lb drs .... lb.	.13¼	.15	.13¼	.15	.13¼	.15
tks, wks ..... lb.	...	.12¾	...	.12¾	...	...
Phenyl-Alpha-Naphthylamine, 100 lb kgs ..... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ..... lb.	...	.17	.16	.17	...	.16
Phenylhydrazine Hydrochloride, com ..... lb.	2.30	6.50	2.30	6.50	2.90	3.00
Phloroglucinol, tech, tins .. lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ..... lb.	20.00	22.00	20.00	22.00	20.00	22.00

Current

Phosphate Rock
Rosin Oil

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Phosphate Rock, f.o.b. mines					
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis ton	...	2.35	...	2.35	...	2.35
72% basis ton	...	2.85	...	2.85	...	2.85
75-74% basis ton	...	3.85	...	3.85	...	3.85
75% basis ton	...	5.50	...	5.50	...	4.35
Tennessee, 72% basis ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases lb.	.40	.44	.40	.44	.40	.45
Sesquisulfide, 100 lb cs. lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl lb.	.15	.18	.15	.20	.16	.20
Yellow, 110 lb cs, wks. lb.	.24	.30	.24	.33	.28	.33
Phthalic Anhydride, 100 lb drs, wks lb.	.14½	nom.	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist lb.	.52	.55	.49	.65	.44	.50
Steam dist wat wh bbls gal.	...	.69	.64	.79	.64	.65
tks gal.	...	.64	.59	.74	...	.59
Pitch Hardwood, wks ton	18.25	18.75	15.00	18.75	...	15.00
Coaltar, bbls, wks ton	...	19.00	...	19.00	...	19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.03½	.06½	...	.03½
Imported lb.	.11½	.12½	.11	.13	.11	.13
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls bbl.	6.00	6.50	6.00	6.50	4.00	5.25
Stearin, drs lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd oz.	47.00	56.00	45.00	68.00	34.50	64.00

POTASH

Potash, Caustic, wks, sol. lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake lb.	.07	.07½	.07	.07½	.07	.07½
Liquid, tks lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported 30% basis, blk unit	...	.58½	.55	.58½	...	...
Potassium Abietate, bbls lb.	...	.13	...	...	...	...
Acetate lb.	.26	.28	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls lb.	.09	.18	.09	.18	.09	.18
Bichromate Crystals, 725 lb cks* lb.	.08½	.09	.08½	.09	.08½	.09
Binoxalate, 300 lb bbls. lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks lb.	.06½	.07	.06½	.07	.06½	.07½
liquid, tks lb.	...	.02¾	...	.02¾	.02¾	.02⅞
drs, wks lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.03¼
Chlorate crys, 112 lb kgs, wks lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs lb.	.12	.13	.12	.13	.12	.13
powd, kgs lb.	.08½	.08¾	.08½	.08¾	.08	.08¼
Chloride, crys, bbls lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs lb.	.28	.29	.28	.29	.23	.28
Cyanide, 110 lb cases lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls lb.	.93	1.00	.93	1.15	1.10	1.25
Metabisulfite, 300 lb bbls lb.	.11	.12	.11	.15	.13¾	.15
Muriate, bgs, dom, blk unit	...	.53½	.50	.53½	.45	.50
Oxalate, bbls lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls lb.	.35	.37	.35	.37	.35	.38½
Yellow, bbls lb.	.15	.16	.15	.18	.16	.19
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	33.75	36.25
Titanium Oxalate, 200 lb bbls lb.	.33	.35	.33	.35	.32	.35
Pot & Mag Sulfate, 48% basis bgs ton	...	25.75	24.75	25.75	22.25	24.75
Propane, group 3, tks lb.	.03	.04⅜	.03	.04⅜	.03	.04⅜
Putty, coml, tubs 100 lb.	...	2.90	2.90	3.00	2.75	3.00
Linseed Oil, kgs 100 lb.	...	4.65	4.65	4.75	4.50	4.75
Pyrethrum, conc liq: 2.4% pyretherins, drs, frt allowed gal.	5.00	5.25	4.15	5.25	...	...
3.6% pyretherins, drs, frt allowed gal.	7.75	7.85	6.10	7.85	...	...
Flowers, coarse, Japan, bgs lb.	...	.14¾	.12¾	.14¾	...	...
Fine powd, bbls lb.	...	.17¾	.14	.17¾	...	...
Pyridine, denat, 50 gal drs gal.	...	1.55	1.30	1.55	...	1.30
Pyrites, Spanish cif Atlantic ports, blk unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks lb.	...	.03	.02⅞	.03	.02⅝	.02⅞
450 lb bbls, c-l lb.	...	.03½	.03½	.03⅞	.03⅝	.03⅞
Solid, 63%, 100 lb bales cif lb.	...	.04	.03⅞	.04	.03⅝	.03⅞
Clarified, 64%, bales lb.	...	.04¼	.04¼	.04⅜	.03⅞	.04⅜
Quercitron, 51 deg liq, 450 lb bbls lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs lb.	.10	.12	.10	.12	.10	.12

R SALT

R Salt, 250 lb bbls, wks lb.	.52	.55	.52	.55	.52	.57
Resorcinol tech, cans lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst lb.	.16	.16½	.14½	.16½	.14	.15
Powd, bbls lb.	.15	.15½	.13½	.15½	.13	.14
Rosin Oil, bbls, first run gal.	.58	.60	.58	.73	.38	.71
Second run gal.	.60	.62	.60	.75	.43	.73
Third run, drs gal.	.64	.66	.64	.79	.49	.77

* Spot price is ½c higher.

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CAMDEN, N. J. BOSTON, MASS.

Rosins
Sodium Nitrate

Prices

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	9.05	8.30	10.00	4.45	10.95
D	...	9.10	8.35	10.35	4.95	10.95
E	...	9.10	8.80	10.25	5.15	10.95
F	...	9.25	9.05	10.80	5.40	10.95
G	...	9.25	9.05	10.85	5.50	10.95
H	...	9.25	9.05	10.85	5.60	10.95
I	...	9.25	9.05	10.90	5.70	10.95
K	...	9.25	9.05	10.90	5.55	10.95
M	...	9.25	9.05	11.00	5.60	10.95
N	...	9.30	9.10	11.05	5.70	11.00
WG	...	9.45	9.15	11.75	5.85	11.00
WW	...	10.05	9.85	13.75	5.90	12.05
Rosins, Gum, Savannah (280 lb unit):						
B	...	7.80	7.05	8.75	3.15	9.70
D	...	7.85	7.10	9.00	3.75	9.70
E	...	7.85	7.55	9.10	3.90	9.70
F	...	8.00	7.80	9.55	4.10	9.70
G	...	8.00	7.80	9.60	4.20	9.70
H	...	8.00	7.80	9.60	4.30	9.70
I	...	8.00	7.80	9.65	4.35	9.70
K	...	8.00	7.80	9.65	4.30	9.70
M	...	8.00	7.80	9.75	4.35	9.70
N	...	8.05	7.85	9.75	4.45	9.75
WG	...	8.20	7.90	10.50	4.45	9.75
WW	...	8.80	8.60	12.50	4.55	10.80
X	...	8.80	8.70	12.50	4.55	10.80
Rosin, Wood, c-l, FF grade, NY	8.56	9.65	8.56	10.72	6.10	10.52
Rotten Stone, bgs mines..ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls ...lb.	...	.12	...	...	...	...
Powdered, bbls .....lb.	.08½	.10	...	...	...	...

SAGO FLOUR

Sago Flour, 150 lb bgs ...lb.	.03¼	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.15	...	1.15	1.15	1.30
Salt Cake, 94-96%, c-l, wks ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks .....ton	11.00	12.00	11.00	12.00	11.00	13.00
Saltpetre, gran, 450-500 lb bbls .....lb.	.06	.064	.06	.064	.059	.06¼
Cryst, bbls .....lb.	.07	.074	.07	.074	.069	.08
Powd, bbls .....lb.	.07	.074	.07	.074	.069	.07¾
Satin, White, 550 lb bbls..lb.	...	.01½	...	.01½	...	.01½
Schaeffer's Salt, kgs .....lb.	.46	.48	.46	.48	.46	.50
Shellac, Bone dry, bbls..lb. *r*	.17½	.18	.17½	.22	.17½	.26½
Garnet, bgs .....lb.	.14	.15	.14	.17	.16	.20
Superfine, bgs .....lb. *s*	.13½	.14	.13½	.18½	.14½	.18½
T. N., bgs .....lb. *s*	.12½	.13	.12½	.14½	.13½	.16
Silver Nitrate, vials .....oz.	.32⅞	.34⅞	.32⅝	.35½	.32⅛	.34⅞
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.23	...	1.23
blk .....100 lb.	...	1.05	...	1.05	...	1.05
paper bgs .....100 lb.	...	1.20	...	1.20	...	1.20
bbls .....100 lb.	...	1.50	...	1.50	...	1.50
Caustic, 76% grnd & flake, drs .....100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks ..100 lb.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs .....lb.	...	.13	.08	.13	...	.08
Acetate, tech, 450 lb bbls, wks .....lb.	.04¼	.05	.04¼	.05	.04½	.05
Alignate, drs .....lb.	...	.69	.64	.69	...	.64
Antimoniate, bbls .....lb.	.14¾	.15½	.13¾	.16¼	.12	.14
Arsenate, drs .....lb.	.08	.08½	.08	.11½	...	.10½
Arsenite, liq, drs .....gal.	.30	.33	.33	.40	.40	.75
Benzoate, USP, kgs ....lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.75	...	1.75	1.75	1.85
Bichromate, 500 lb cks, wks* .....lb.	.06½	.07	.06½	.07	.06½	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	...	...	...	...
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.16½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks .....lb.	.07½	.08¼	.07½	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.16	.17	.16	.17	.17	.19
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide .....lb.	1.90	1.95	1.90	1.95	1.90	2.05
Metal, drs, 280 lbs .....lb.	...	.19	...	.19	...	...
Metanilate, 150 lb bbls..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks .....100 lb.	...	2.15	...	2.15	2.15	3.00
cryst, bbls, c-l, wks 100 lb.	...	2.75	...	2.75	2.75	3.25
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.023
Naphthenate, drs .....lb.	.12	.19	.09	.19	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY .....ton	...	28.30	26.80	28.30	24.80	26.80
100 lb bgs .....ton	...	29.00	27.50	29.00	25.50	27.50
Bulk .....ton	...	27.00	25.50	27.00	23.50	25.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ½c higher.

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Sodium (continued):					
Nitrite, 500 lb bbls .....lb.	.07	.10	.07	.10	.07	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.18
Peroxide, bbls, 400 lb...lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	1.90	...	1.90	1.95	2.30
bgs, wks .....100 lb.	...	1.70	...	1.70	1.75	2.10
Tri-sodium, tech, 325 lb bbls, wks .....100 lb.	...	2.05	...	2.05	1.95	2.30
bgs, wks .....100 lb.	...	1.85	...	1.85	1.75	2.10
Picramate, 160 lb kgs ...lb.	.65	.67	.65	.67	.65	.69
Prussiate, Yellow, 350 lb bbl, wks .....lb.	.10	.11½	.10	.11½	.10	.12
Pyrophosphate, anhyd, 100 lb bbls .....lb.	...	.10	...	.10	.10	.132
Sesquisilicate, drs, c-l, wks .....100 lbs.	...	3.00	...	...	...	...
Silicate, 60°, 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks .....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .....lb.	.05¾	.06½	.05¾	.07	.05¼	.07¼
Stannate, 100 lb drs ....lb.	.37½	.40½	.33	.44	.28½	.37½
Stearate, bbls .....lb.	...	.24	.19	.24	.20	.26
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks .....100 lb. ‡	1.45	1.90	1.45	1.90	1.30	1.90
Sulfide, 80% cryst, 440 lb bbls, wks .....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks .....lb.	...	.02	...	.02	...	.03
Sulfite, cryst, 400 lb bbls, wks .....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs .....lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	...
Tungstate, tech, crys, kgs lb.	...	nom.	.85	.90	.85	.90
Sorbitol, com., drs, basis content, wks .....lb.	...	.25	...	.25	...	...
Spruce Extract, ord, tks...lb.	...	.01	...	.01	...	.01
Ordinary, bbls .....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks...lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs .....lb.	...	.04¼	.04	.04¼	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	3.78	3.98	3.78	4.53	2.99	4.30
Powd, 140 lb bgs ...100 lb.	3.88	4.08	3.88	4.63	3.90	4.54
Potato, 200 lb bgs .....lb.	...	.05½	.04½	.05½	.04½	.05½
Imp, bgs .....lb.	.05½	.06	.05	.06	.05	.06
Rice, 200 lb bbls .....lb.	...	.07¼	...	.07¼	...	.07¼
Wheat, thick, bgs .....lb.	.07	.08½	.07	.08½	.08¼	.08½
Strontium carbonate, 600 lb bbls, wks .....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks .....lb.	.45	...	.45	...	.45	...
tech, bbls, wks .....lb.	.40	...	.40	...	.40	...
Sulfur, crude, f.o.b. mines. ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.65	2.35	1.65	2.35	1.60	2.35
bbls .....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.85	3.00	2.85	3.00	2.40	3.00
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.20	2.80
bbls .....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls .....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs .....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls .....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks .....lb.	.03	.04	.02½	.04	...	...
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.06½	.08½
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.05½	.06
tks, wks .....lb.	.04	.05	.04	.05	.04½	.04¾
Refrigeration, cyl, wks lb.	.16	.17	.15	.17	.10	.13
Multiple units, wks ....lb.	.07½	.10	.07½	.10	.07	.09¼
Sulfuryl Chloride .....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton		58.50	58.50	65.00	52.00	60.00
Extract, 42°, bbls .....lb.	.05¼	.06¼	.05¼	.06¼	...	...
Superphosphate, 16% bulk, wks .....ton	...	9.00	8.25	9.00	...	...
Run of pile .....ton	...	8.50	8.00	8.50	...	...
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit .....ton	...	.70	...	.70	...	...
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	22.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	75.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	80.00
Tankage Grd, NY .....unit u	...	3.40	3.40	4.40	2.65	4.25
Ungrd .....unit u	...	3.25	3.25	4.35	2.40	4.25
Fert grade, f.o.b. Chgo unit u	...	3.00	3.00	4.00	2.40	4.00
South American cif .unit u	...	3.60	3.60	4.25	2.70	3.90
Tapioca Flour, high grade, bgs .....lb.	.03¼	.05½	.03¼	.05½	.03½	.05½
Tar Acid Oil, 15%, drs ..gal.	.22½	.25½	.21	.25½	.21	.24
25%, drs .....gal.	.26½	.29½	.24½	.29½	.24	.27½
Tar, pine, delv, drs .....gal.	...	.26	...	.26	.25	.26
tks, delv, E. cities ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls..lb.	.26¾	.27	.24¾	.27	.24¾	.25
USP, bbls .....lb.	.32	.32½	.30	.32½	.28	.30½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks .....lb.	.13	.14	.13	.14	.13	.14

‡ Bags 15c lower; u + 10; * Bbls. are 20c higher.

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SPECIALTIES

Tetrachlorethane
Zinc Stearate

Prices

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.10½	...	.10½	...	...
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.42	.42½	.37½	.46	.35	.39½
Metal, NY lb.	...	.58⅝	.49⅞	.66	.40½	.52½
Oxide, 300 lb bbls, wks lb.	.60	.62	.55	.62	.47	.57
Tetrachloride, 100 lb drs, wks lb.	...	.29½	.25½	.32	.21¼	.26¾
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.19¼
Barium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Calcium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.27	.28
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	...	.75	...	.75	...	.75
Toluidine, bgs lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	.32	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	...
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	...	1.25
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	...
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	...	...
Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs lb.	...	.26½	.22½	.26½	.19	.26
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.30	.26	.30
tks, wks lb.	...	.20	.20	.25	...	.25
Triethylene glycol, drs, wks lb.	...	.26	...	...	...	...
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	...	...	...
Stearate, bbls lb.	...	.30	...	...	...	...
Trimethylamine, c-l, drs, frt allowed E. Mississippi lb.	...	1.00	...	1.00	...	...
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	...	...	...	...
Tripoli, airfloated, bgs, wks ton	25.00	30.00	25.00	30.00	27.50	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.37½	.37½	.47	.40½	.50
Savannah, bbls gal.	...	.31½	.31½	.42	.35½	.45
Jacksonville, bbls gal.	...	.31½	.31½	.41	.35¼	.44½
Wood Steam dist, bbls, c-l, NY gal.	.36	.38	.36	.44	.38	.47
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.17
Fert grade, bgs, c.i.f. ton						
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	110.00
Urea Ammonia liq 55% NH_3, tks unit	No prices		1.00	1.04	...	.96
Valonia beard, 42%, tannin bgs ton	...	48.00	35.00	49.00	46.00	64.50
Cups, 32% tannin, bgs ton	...	34.00	31.50	36.00	34.00	42.00
Vanilin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	3.65	...	3.65	3.65	3.75
Ex-guaiacol lb.	...	3.55	...	3.55	3.55	3.65
Vermillion, English, kgs lb.	...	1.75	1.72	1.90	1.52	1.85
Wattle Bark, bgs ton	41.75	43.75	31.00	43.75	26.50	32.00
Extract, 60°, tks, bbls lb.	...	.04⅝	.03⅝	.04⅝	...	.03⅝
WAXES						
Wax, Bayberry, bgs lb.	.17	.17½	.16½	.17½	.16½	.20
Bees, bleached, white 500 lb slabs, cases lb.	.39	.45	.38	.45	.34	.40
Yellow, African, bgs lb.	.27½	.28	.27½	.30	.24	.27
Brazilian, bgs lb.	.32	.34	.33	.34	.25	.29½
Chilean, bgs lb.	.32	.34	.30	.34	.25	.29½
Refined, 500 lb slabs, cases lb.	.35	.39	.29½	.39	.28	.32
Candelilla, bgs lb.	.14	.14½	.14	.16½	.14	.17½
Carnauba, No. 1, yellow, bgs lb.	.47	.48½	.45	.49	.43½	.48
No. 2, yellow, bgs lb.	.45½	.46	.43½	.46½	.42	.46
No. 2, N. C., bgs lb.	.41½	.42	.38	.43	.38	.40
No. 3, Chalky, bgs lb.	.38⅞	.40	.34½	.40	.33½	.38
No. 3, N. C., bgs lb.	.38⅞	.39	.35	.43	.34	.41
Ceresin, dom, bgs lb.	.08½	.12	.08	.12	.08	.11
Japan, 224 lb cases lb.	.10¾	.11	.09½	.11	.08	.10½
Montan, crude, bgs lb.	.11	.12	.11	.12	.10¼	.11¼
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.22	.24
Cakes, cases lb.	.24	.25	.24	.25	.23	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	...	15.00
Gilders, bgs, c-l, wks ton	...	15.00	...	15.00	11.50	15.00
Wood Flour, c-l, bgs ton	20.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt all'd gal.	...	.30	...	.30	...	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	.14	.15	.12	.15	.09	.11
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.05¾
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	2.00	2.25	...	2.00
Cyanide, 100 lb drs lb.	.36	.38	.36	.38	.36	.38
Zinc Dust, 500 lb bbls, c-l, delv lb.	...	.0915	.079	.094	.068	.0755
Metal, high grade slabs, c-l, NY 100 lb.	...	7.60	6.35	7.85	...	5.825
E. St. Louis 100 lb.	...	7.25	6.00	7.50	4.80	5.45
Oxide, Amer, bgs, wks lb.	.06¼	.06½	.05¼	.06½	.05	.05½
French, 300 lb bbls, wks lb.	.06¼	.07½	.05½	.07½	.05½	.07
Palmitate, bbls lb.	.23	.25	.23	.25	.22	.23
Resinate, fused, pale, bbls lb.	...	.10	.09	.10	.05¾	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.19	.23

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Zinc Sulfate, crys, 400 lb bbl, wks ..... lb.	...	.033	.028	.033	.028	.033
Flake, bbls ..... lb.	...	.0375	.032	.0375	.032	.035
Sulfide, 500 lb bbls, delv lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.11¾
bgs, delv ..... lb.	.09	.09½	.09	.09½	.09	.11½
Sulfocarbolate, 100 lb kgs ..... lb.	.24	.26	.24	.26	.24	.25
Zirconium Oxide, crude, 73-75% grd, bbls, wks ..... ton	75.00	100.00	...	...	...	...
kgs, wks ..... lb.	.04¼	.04½	...	...	...	...

Oils and Fats

Babassu, tks, futures ..... lb.	.07¾	.08	.07¾	.11¼	...	...
Castor, No. 3, 400 lb bbls.. lb.	.10¼	.10¾	.10¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls ..... lb.	.12¾	.13	.12¼	.13	.12¼	.13
China Wood, drs, spot NY lb.	.18	nom.	.12½	.18	.13	.19¼
Tks, spot NY ..... lb.	.18	nom.	.118	.18	.125	.19
Coast, tks ..... lb.	.18	nom.	.133	.18	.127	.18
Coconut, edible, bbls NY.. lb.	.10	.10½	.10	.15	.09¼	.14¼
Manila, tks, NY ..... lb.	.04⅜	.05¼	.05¼	.09½	.04⅛	.07
Tks, Pacific Coast .... lb.	...	.04¼	.04¼	.08⅞	.03⅞	.08½
Cod, Newfoundland, 50 gal bbls ..... gal.	.52	nom.	.51	.52	.40	.48¼
Copra, bgs, NY ..... lb.	.0260	nom.	.0260	.055	.0320	.0535
Corn, crude, tks, mills .... lb.	...	.07¾	.07¾	.10¾	.08	.10½
Refd, 375 lb bbls, NY .. lb.	.10¾	.11	.10¼	.13¼	.10¾	.13
Degras, American, 50 gal bbls. NY ..... lb.	...	.08	.07¾	.08¼	.05¼	.08
English, bbls, NY ..... lb.	...	.08	.07¾	.08¼	.04	.08
Greases, Yellow ..... lb.	.06⅞	.07⅛	.06⅞	.09	.03⅜	.08¼
White, choice bbls, NY.. lb.	.07¾	.08¼	.07¾	.10¼	.04⅛	.08¾
Herring, Coast, tks ..... gal.	...	nom.	...	nom.		.31
Lard Oil, edible, prime ... lb.	...	.15	.14¾	.16¾	.12¾	.16¼
Extra, bbls ..... lb.	...	.13	.13	.13½	.09½	.13
Extra, No. 1, bbls ..... lb.	...	.12	.12½	.13½	.07¾	.12¼
Linseed, Raw less than 5 bbl lots ..... lb.	. .	.118	.107	.121	.104	.117
bbls, c-l, spot ..... lb.	...	.11	.099	.113	.096	.103
Tks ..... lb.	...	.104	.093	.107	.086	.097
Menhaden, tks, Baltimore gal.	...	.37½	.37	.45	.25	.36
Refined, alkali, drs ..... lb.	...	.082	.082	.10	.066	.084
Tks ..... lb.	...	.076	.076	.09	.062	.078
Kettle bodied, drs ..... lb.	...	.092	.092	.11	.08	.096
Light pressed, drs ..... lb.	...	.076	.076	.094	.06	.078
Tks ..... lb.	...	.069	.069	.084	.056	.072
Neatsfoot, CT, 20°, bbls, NY ..... lb.	...	.17¼	.17¼	.18¼	.16	.17
Extra, bbls, NY ..... lb.	...	.12¼	.12¼	.13¾	.08	.12½
Pure, bbls, NY ..... lb.	...	.13	.13	.14¼	.11½	.12¾
Oiticica, bbls ..... lb.	.14½	nom.	.10⅞	.14½	.10	.15½
Oleo, No. 1, bbls, NY .... lb.	...	.13	.12⅜	.14½	.09¼	.14
No. 2, bbls, NY ..... lb.	...	.12¼	.11⅞	.14	.08¾	.13½
Olive, denat, bbls, NY ... gal.	1.35	nom.	1.35	1.65	.73	1.60
Edible, bbls, NY ..... gal.	2.40	nom.	2.20	2.50	1.60	2.25
Foots, bbls, NY ..... lb.	.11	nom.	.11	.12½	.08	.10⅜
Palm, Kernel, bulk ..... lb.	...	.05	.05	.08⅛	.04¾	.083
Niger, cks ..... lb.	...	.05¼	.05¼	.07¼	.04	.06½
Sumatra, tks ..... lb.	...	.05	.05	.06½	.03¾	.06½
Peanut, crude, bbls, NY .. lb.	.07⅜	nom.	.07⅜	.10⅝	.08	.10½
Tks, f.o.b. mill ..... lb.	.07½	nom.	.07½	.10¾	.17¾	.10⅜
Refined, bbls, NY ..... lb.	.11½	nom.	.11½	.13½	.12	.13¼
Perilla, drs, NY ..... lb.	...	.12½	.11	.12½	.07	.11¾
Tks, Coast ..... lb.	...	.12	.105	.12	.066	.11¼
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.14¼	.14½	.13	.14½	.086	.13½
Denatured, drs, NY ... gal.	.95	.96	.85	.97	.52	.85
Red, Distilled, bbls ..... lb.	.10⅞	.11⅞	.10⅞	.12⅝	.08⅝	.11⅝
Tks ..... lb.	...	.10	.10	.10¾	.07¾	.09¾
Salmon, Coast, 8000 gal tks ..... gal.	...	nom.	.	nom.	.31	.32½
Sardine, Pac Coast, tks .. gal.	...	.37½	.37½	.55	.28	.47
Refined alkali, drs ..... lb.	...	.082	.082	.10	.066	.084
Tks ..... lb.	...	.076	.076	.09	.062	.078
Light pressed, drs ..... lb.	...	.076	.076	.094	.06	.078
Tks ..... lb.	...	.069	.069	.084	.056	.072
Sesame, yellow, dom ..... lb.	.11½	nom.	.11½	.13¼	.12¾	.14½
White, dos ..... lb.	.11½	nom.	.11½	.13¼	.12¾	.14½
Soy Bean, crude Dom, tks, f.o.b. mills ... lb.	.08½	nom.	.08½	.10½	.07	.10½
Crude, drs, NY ..... lb.	.091	.095	.091	.11½	.076	.11½
Ref'd, drs, NY ..... lb.	.101	.105	.101	.12½	.081	.12½
Tks ..... lb.	...	.09½	.09½	.11½	.07½	.11½
Sperm, 38° CT, bleached, bbls NY ..... lb.	.10	.102	.096	.102	.094	.102
45° CT, bleached, bbls, NY ..... lb.	.093	.095	.089	.095	.087	.095
Stearic Acid, double pressed dist bgs ..... lb.	.12	.13	.12	.13½	.08½	.12½
Double pressed saponified bgs ..... lb.	.12¼	.13¼	.12¼	.13¾	.09	.12¾
Triple pressed dist bgs .. lb.	.15	.16	.15	.16½	.11¼	.15½
Stearine, Oleo, bbls ..... lb.	.09	.09¼	.09	.11½	.07¼	.12¼
Tallow City, extra loose .. lb.	...	.07⅜	.07⅜	.09¼	.04⅛	.08⅜
Edible, tierces ..... lb.	. .	.08¼	.08¼	.10¼	.06¾	.09½
Acidless, tks, NY ..... lb.	...	.12	.12	.13	.07	.11¾
Turkey Red, single, bbls .. lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls ..... lb.	.12½	.13	.12½	.13	.12½	.13½
Whale: Winter bleach, bbls, NY lb.	.098	.10	.091	.111	.072	.087
Refined, net, bbls, NY .. lb.	.094	.096	.087	.107	.068	.083

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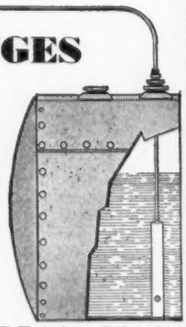

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GDC

"We"—Editorially Speaking

Add to your "goofy chemistry" stories the thrilling detective yarn that appeared recently under "Science Puzzlers" by Robert Locke—a gruesome tale of a "bootleg dye" factory and poisoning by means of "analine."

❖❖❖❖

What really puzzles us is why anyone should want to bootleg dyes—output and prices being as reported last month in the Tariff Commission Dye Census.

❖❖❖❖

"Goofy chemistry" from another angle —the story carried by financial pages about one of the big chemical companies which was reported recently to have signed a contract for delivery of $600,000 worth of a by-product. Upon the strength of this the company's stock was given a nice little ride through Wall Street. The facts are that this material is a cross-eyed step-child which has always caused trouble and the sale represented a loss that gets bigger and bigger as the output of this obligatory waste gets larger and larger.

❖❖❖❖

The Editor of the *Pontiac* (Mich.) *Press* is all steamed up about the horrors of modern warfare and penned on Aug. 17 a beautifully written screed. "We" cordially concur with his conclusions and are sorry indeed his premise was a wee bit weak in its facts. He wrote:

> Chemical Warfare Service or Chemical Corps? Which shall the Federal unit devoted to making poison gas be called? The problem was debated at Washington. It doesn't matter how the soldiers who employ deadly chemicals as a means of killing their enemies designate their department. Its purpose is certain death, as every schoolboy knows, to be dealt by lethal vapors. It aims to kill, to maim and to seriously injure the poor devils in the trenches on the other side.

What every editor should know is that the objective of a gas attack is temporarily so to incapacitate an enemy that their position becomes untenable and may be taken by assault. Anyone who has lived through an attack or an aerial raid, or who reads the news stories in any newspaper from Spain or China, or who is familiar with the authentic casualty statistics of the world war knows that the horrors (and deaths) of modern warfare come from high explosives, not gas.

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As a counter balance we quote the opening only of another extremely vigorous and well written editorial from the *New Haven* (Conn.) *Journal-Courier* of Aug. 26:

> "Manila, P. I., Aug. 23 (AP).—Child refugees screamed today as welcoming airplanes swooped low over the liner President Roosevelt, bearing 871 persons fleeing from the Shanghai war zone."
>
> "Child refugees screamed . . ." Nothing in all the tales of horror daily clotting the news from battle fronts can surpass the bitter tragedy of those words. There, indelibly dramatized, is the ruthless terror of modern warfare which is no longer a conflict between armies but a death-struggle between entire populations, a carnage in which civilization itself is shattered. Destruction drives through civilian ranks, drops from the skies upon homes and playgrounds, reaps with impartial stroke the innocent and the aged, and brings such brooding horror that often death itself seems merciful.

❖❖❖❖

A cable from Budapest tells us that a Hungarian chemist has "developed" an imitation silkworm—maybe there's a use for tent caterpillars after all.

Fifteen Years Ago

From our issues of September, 1922

Henry Howard named head Chemical Advisory Board by Hoover.

Allied Chemical, through Wm. H. Nichols, offers prize of $25,000, to be awarded annually to American making most notable contribution to chemical science.

H. R. Higgins severs connection with Ciba Co.

Burkhart-Schier Chemical, Chattanooga, recently organized with capitalization of $100,000, will specialize in textile chemicals.

Merrimac Chemical announces appointment of Wm. M. Rand as Sales Manager.

Myron S. Hazen, vice president Bowker Insecticide, now in charge New York Sales Department, American Agricultural Chemical.

Annual Exposition Chemical Industries held in Grand Central Palace.

Seydel Chemical declares 8% dividend on Preferred Stock.

California Chemical leases land at Wilmington, Calif., for erection large soap plant.

Two well known vice presidents of a well known chemical company were lunching together and one complained to the other that his secretary had dropped four dictaphone records of important letters that morning.

"Is that the same girl you had to send off to the nursing home for three weeks last Spring?"

"Yes."

"Awkward, isn't she?"

❖❖❖❖

The president of one of the large alkali companies has figures on his desk that show an increase since 1929 in every item of operating costs from 45 per cent. in labor to two per cent. in power.

❖❖❖❖

And it's a sign of the times that another large chemical company has notified all its salesmen not to slur over the clause in their contracts which provides for quarterly price revisions on 15 days notice: "We prefer a frank discussion and complete understanding with the purchaser . . . and we must avoid any situation wherein it is either expressed or implied that an absolutely firm price is extended for a period of 12 months."

❖❖❖❖

Looks as though when the leaves begin to fall some chemical prices were going to rise.

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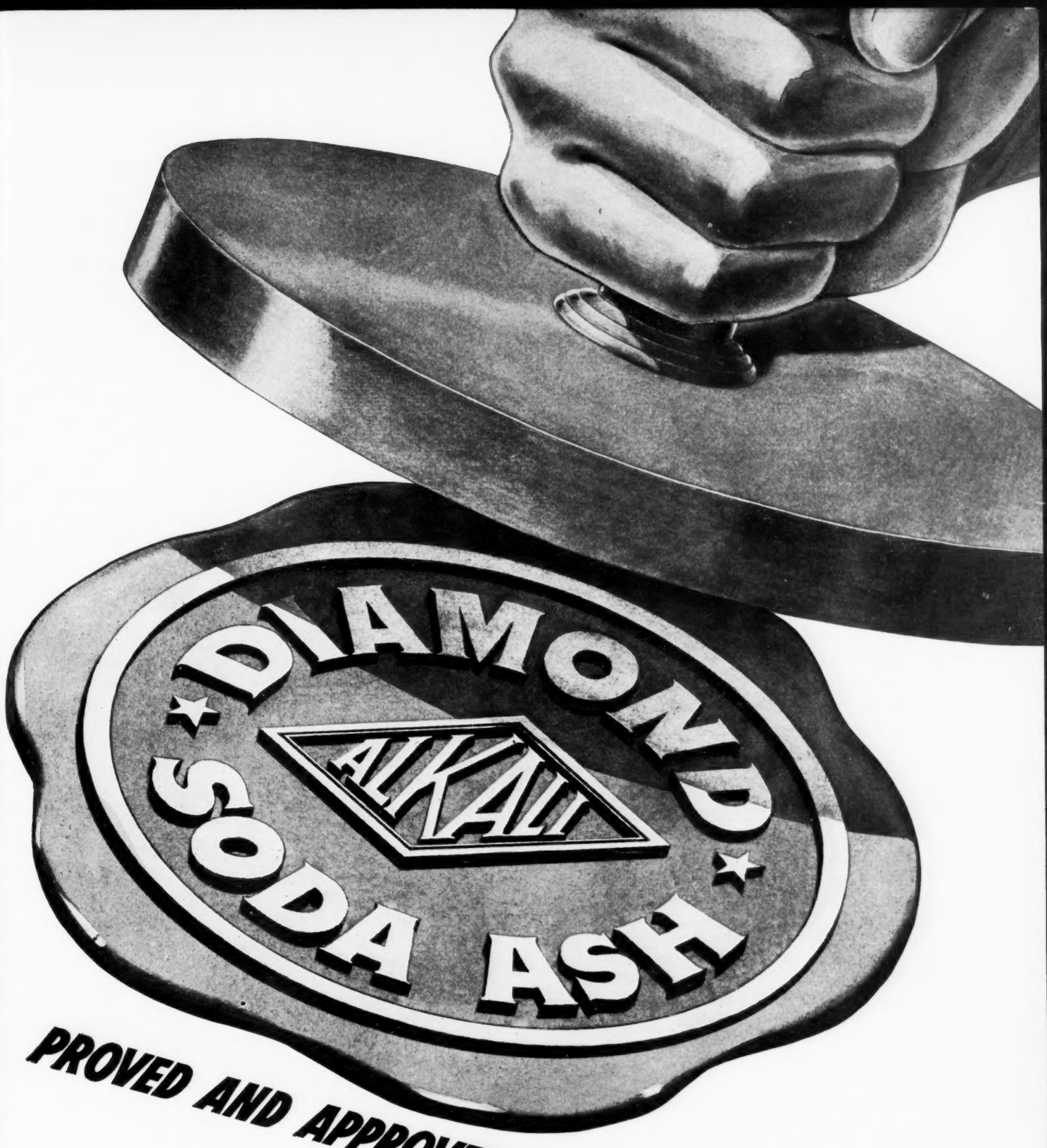
Tops in the power alcohol controversy is the news from the Belgian Congo that palm oil is a perfectly satisfactory motor fuel.

❖❖❖❖

The height of specialization in the chemical specialty field is application to the Nebraska Legislature to license the sale of tombstone-cleaning fluid.

❖❖❖❖

We've all heard of chaps being "well-shellacked," but this appears to be nothing to the mummifying process developed by a University of Illinois post-graduate student who after dehydration proposes literally to impregnate the corpse with a nitrocellulose solution. This is said to out-Egyptian the best of the Egyptian methods.



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